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**ARCHAEOLOGICAL MONITORING REPORT  
DURING CONSTRUCTION OF THE SLURRY WALL  
FOR THE STANDARD CHLORINE CHEMICAL COMPANY  
SITE, INTERIM RESPONSE ACTION WORKPLAN  
TOWN OF KEARNY, HUDSON COUNTY, NEW JERSEY**

*Prepared For:*

**Peninsula Restoration Group  
On behalf of Beazer East, Inc., Standard Chlorine Chemical Co., Inc and  
Tierra Solutions, Inc.**

*For Submission to:*

**United States Environmental Protection Agency  
Region 2  
New York Remediation Branch  
290 Broadway  
New York, NY 10007**

**And**

**State of New Jersey  
Department of Environmental Protection  
Historic Preservation Office  
Mail Code 501-04B  
PO Box 420  
Trenton, NJ 08625-0420**

*Prepared By:*

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And  
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River Drive Center 1  
Elmwood Park, NJ 07407  
NJ Certificate of Authorization No: 24GA27996400**

**April 2012  
1872504**



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## ABSTRACT

Langan Engineering and Environmental Services, Inc. (Langan) was retained by the Peninsula Restoration Group on behalf Beazer East, Inc. (Beazer), Standard Chlorine Chemical Co., Inc. (SCCC) and Tierra Solutions, Inc. (Tierra), to conduct archaeological monitoring during the construction of a slurry wall around the perimeter of the project site. The purpose of the monitoring was to determine if prehistoric materials were present in a 3 to 8 foot thick sand layer located below the marsh mat (also known as meadow mat or tidal marsh deposits) and fill, approximately 9 to 17 feet below surface

The slurry wall is approximately 7,000-feet long and is located on all properties on the site. Construction of the wall required excavation of a trench approximately 3-feet wide and up to a depth of approximately 28-feet below surface. Based on a previous study of local geomorphology, it was anticipated that prehistoric materials might be encountered in the sand layer during the excavation of the trench.

Archaeological Monitoring consisted of obtaining soil samples approximately every 500 feet along the slurry wall alignment, for a total of 14 sampling stations. The excavation at the sampling stations was monitored by a Langan archaeologist to assure the appropriate soils were recovered and sampled. When possible a smaller interim sample was taken at the midpoint between sampling stations to confirm earlier findings. It was anticipated that up to 1.5 cubic yards of soil would be obtained from each sampling station or approximately 30 5-gallon buckets per sampling station for screening purposes (interim samples consisted of approximately 10 buckets).

Fieldwork for the archaeological monitoring originally began on 6 December 2010 and ran until 10 December 2010. The first sample was recovered on 8 December and processed on 9 December 2010. On 18 December 2010 the slurry wall excavation was postponed due to cold weather considerations. The project was started again in March of 2011. The remainder of the field work was conducted from 17 March to 29 April 2011. A total of 14 primary samples and 7 interim samples were tested. For screening of the samples, two large aluminum screens were set up on metal saw horses in the contaminated soils containment area (CA). The sample material was screened and the remaining material examined for potential artifacts

The archaeological monitoring resulted in the recovery of approximately 200 possible lithic flakes, debitage and one possible core for further analysis. The majority of the artifacts were recovered from the eastern and western sections of the slurry wall. After further analysis the number of flakes and potential flakes was reduced to a total of 47 flakes, 99 possible flakes and one micro core. The highest density of lithics was recovered along the Hackensack River in Samples 12, 13, 13i, and 14 on the eastern edge of the project site. A total of 133 flakes and potential flakes were recovered in this area and an archaeological site form will be prepared and enclosed with this report.

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## 1.0 INTRODUCTION

Langan Engineering and Environmental Services, Inc. (Langan) was retained by the Peninsula Restoration Group on behalf of Beazer East, Inc. (Beazer), Standard Chlorine Chemical Co., Inc. (SCCC) and Tierra Solutions, Inc. (Tierra), to conduct archaeological monitoring during construction of a proposed slurry wall around the perimeter of the project site to determine if prehistoric materials were present in the sand layers below the marsh mat (also known as meadow mat or tidal marsh deposits). The archaeological monitoring was requested by the New Jersey Historic Preservation Office (SHPO) in letter dated 29 December 2009 (Appendix C) and is a part of continuing consultation for the Section 106 process.

All work for this project was carried out in accordance with the instructions and the intents set forth in section 106(b)(4) of the National Historic Preservation Act of 1966, as amended; Sections 1(3) and 2(b) of Executive Order 11593; CFR 771 as amended October 30, 1980; the guidelines developed by the Advisory Council on Historic Preservation published November 26, 1980; the Procedures for the Protection of Historic and Cultural Properties as set forth in 36 CFR Part 800 and New Jersey Register of Historic Places Act, NJAC 7:4. Inquiries concerning the availability of this report should be directed to the New Jersey State Historic Preservation Office (SHPO) in Trenton, New Jersey.

This report was prepared in accordance with the phase I guidelines found in *Guidelines for Preparing Cultural Resource Management Archaeological Reports Submitted to the Historic Preservation Office* (July, 2000). Langan Cultural Resource Management (CRM) personnel who meet the *National Park Service's Professional Qualifications Standards* conducted the survey and prepared the report. Resumes of the key personnel are presented in Appendix A.

### 1.1 Site Description

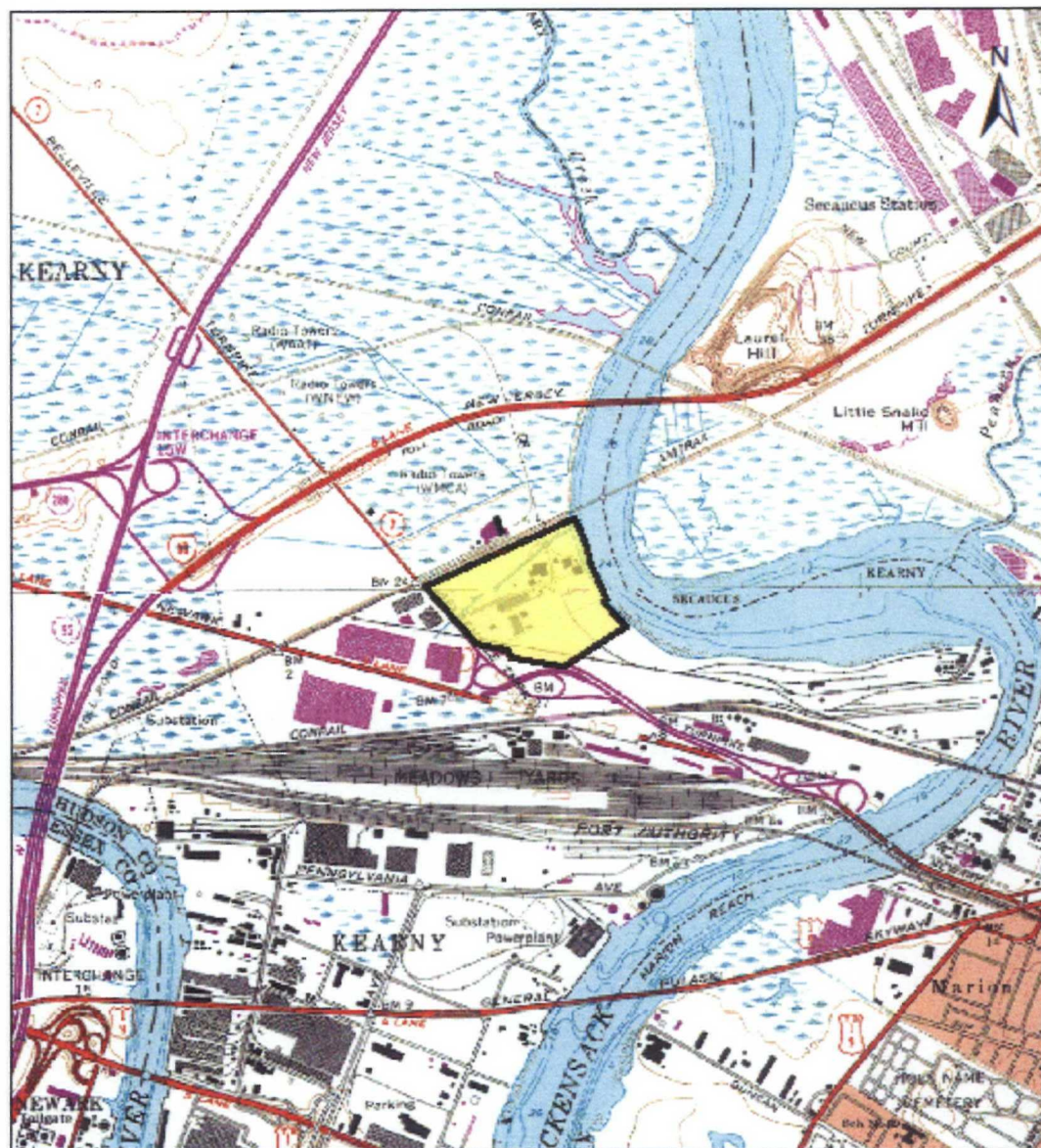
The project site consists of the area addressed by the Interim Response Action Workplan (IRAW), which includes the SCCC Site (consisting of the former White Tar company property, and the former Edison Battery Plant property among others), the Diamond site and a portion of the (Koppers) Seaboard Site. The project site is located on the Kearny Peninsula in the Town of Kearny, New Jersey Figures (1 and 2) and lies at the upstream end of a large meander bend on the Hackensack River. Like most of the Meadowlands, the project site lies at or just above mean sea level; relief is present only in areas where fill has been mounded on the surface. The project site is approximately 60 acres in size and is located at 1015 and 1025-1035 Bellville Turnpike in the Town of Kearny. The site is also known as Block 287, Lots 32.01, 44, 45, 46, 47, 47R, 48, 49, 50, 51, 52, 52R, 54, 56 and parts of Lots 55 and 62 on the Town of Kearny Tax Maps, sheet M8 (Figure 3). The project site is currently occupied by multiple buildings, structures, paved driveways and a lagoon area. Areas not occupied by buildings, pavement, or lagoons are vegetated in brush, grasses, and phragmites.



The project site is bounded by Amtrak's Northeast Corridor Rail Line to the north, the Hackensack River to the east, the remaining portion of the (Koppers) Sea Board site to the south and Belleville Turnpike to the west and southwest. The general vicinity of the project is industrial.

## **1.2 Project Description**

The project consists of the construction of a slurry wall as part of the Interim Remedial Action Workplan (IRAW). The slurry wall is approximately 7,000-feet long and is located on all properties on the site (Figure 4). The wall required the excavation of a trench approximately 3-feet wide and up to a depth of approximately 28-feet below surface. The proposed slurry wall may encounter prehistoric materials during the excavation portion of the project. Therefore, archaeological monitoring and sampling was request by SHPO. This report presents the methodology and results for the archaeological monitoring conducted during the excavation and construction of the slurry wall.



Map Reference: USGS 7.5' Topographic Map Series: Jersey City and Weehawken Quadrangles (1967 Revised 1981).

2,000 1,000 0 2,000  
SCALE IN FEET

 Project Area

**LANGAN**  
A Division of TWC, 201 River Drive  
Rear Drive Center 1  
500 River Drive  
Edwood Park, NJ 07427  
P: 201.794.6900 F: 201.794.0288  
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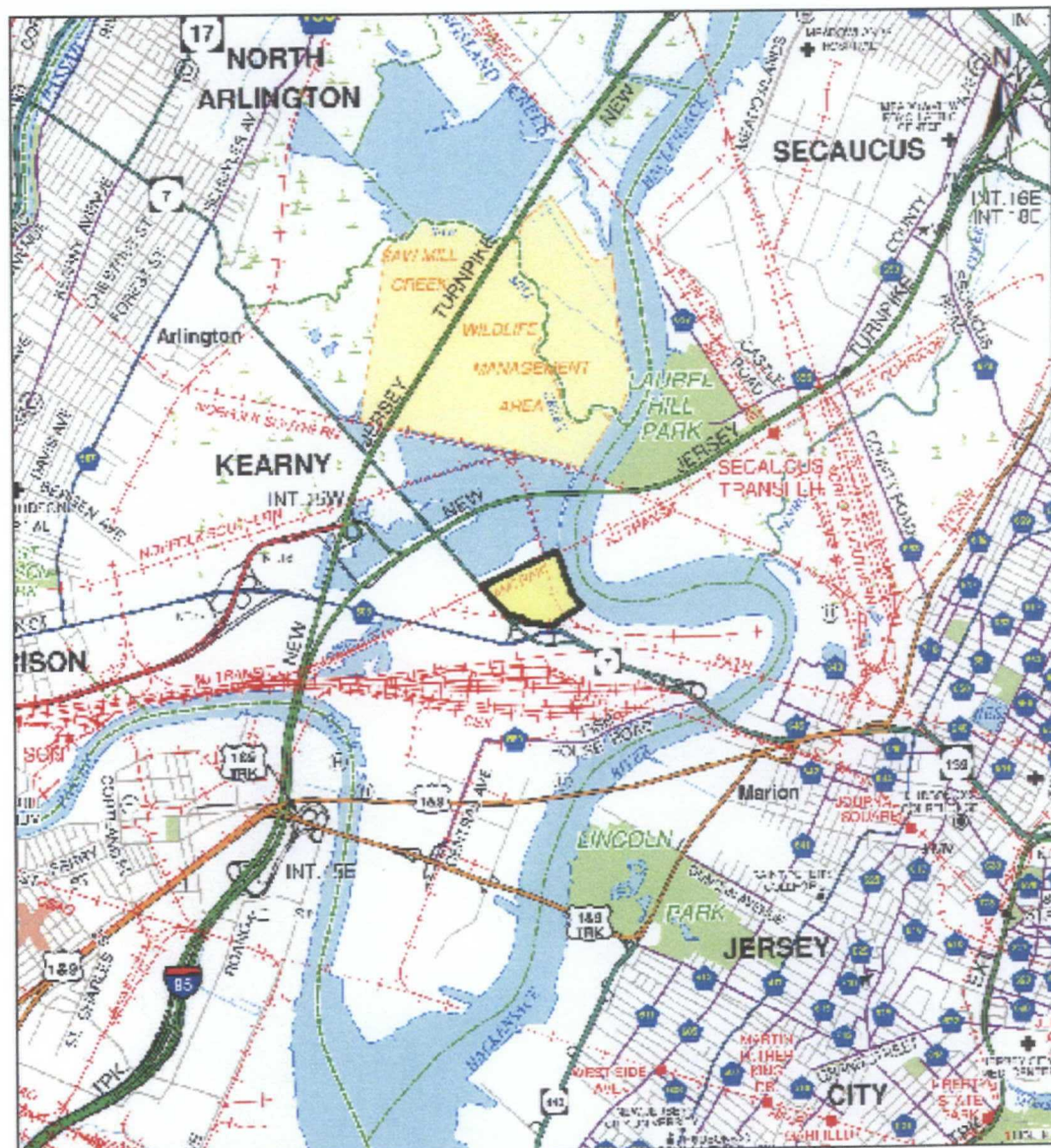
**USGS TOPOGRAPHIC MAP**  
KEARNY TOWNSHIP

HUDSON COUNTY NEW JERSEY  
Project No. 1872504 Date 6/8/09 Scale 1" = 2000' Figure No. 1

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Q:\Data\1872504\ArcGIS\MapDocuments\Figure 1 - USGS.mxd





Map Reference: Hudson County, State of New Jersey, Mapping by the N.J. Department of Transportation, 2008

4,000 2,000 0 4,000  
SCALE IN FEET

 Project Area

**LANGAN**  
River Drive Center  
610 River Drive  
Elmwood Park, NJ 07607  
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www.langan.com

NEW JERSEY PENNSYLVANIA NEW YORK CONNECTICUT FLORIDA NEVADA  
NJ Certificate of Authorization No. 345A27086-000

**SITE VICINITY**  
KEARNY TOWNSHIP

HUDSON COUNTY

NEW JERSEY

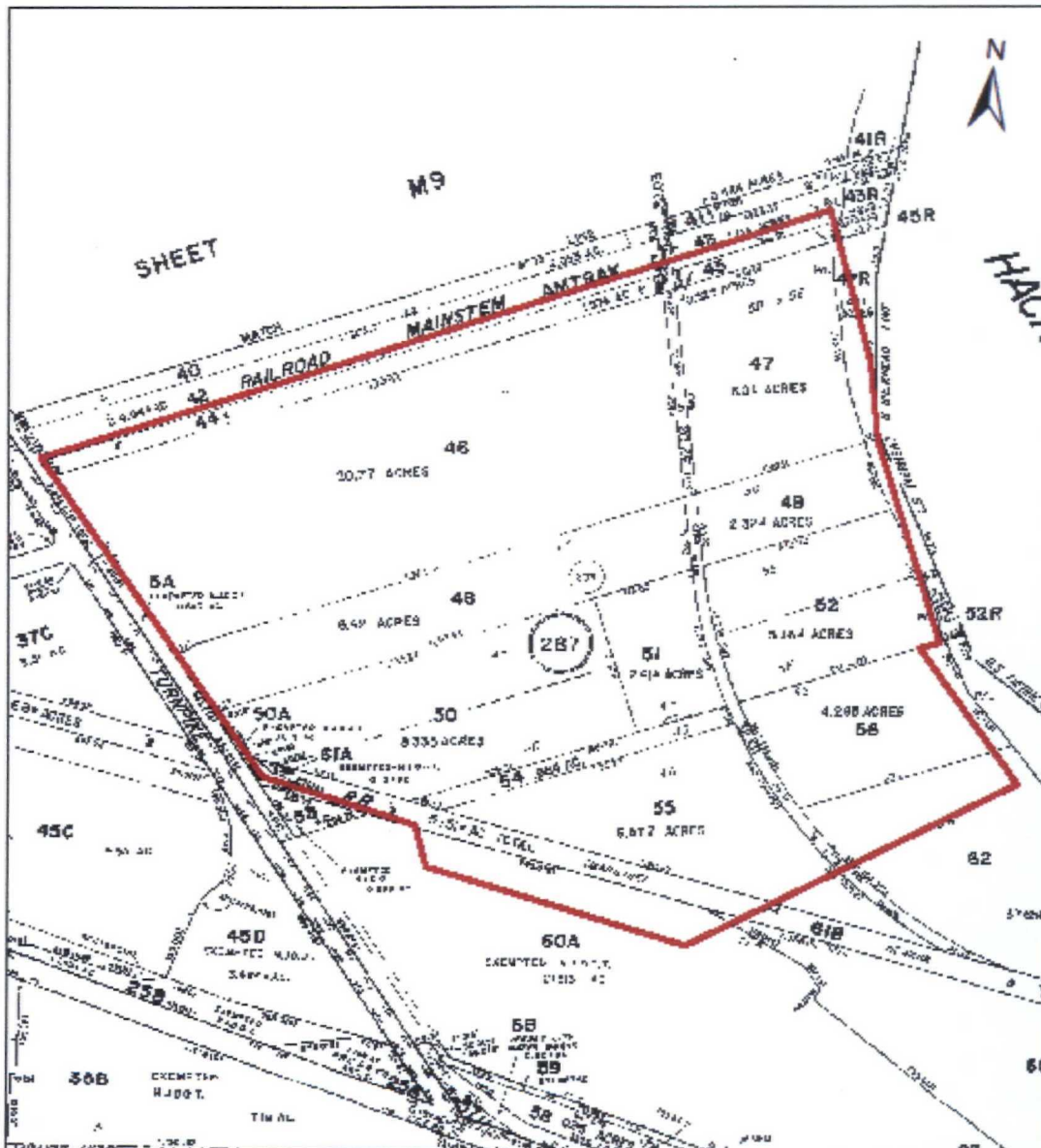
Project No.  
1872504

Date  
6/8/09

Scale  
1" = 4,000'

Figure No.  
2

G:\Data\1872504\ArcGIS\MapDocuments\Figure 2 - Vicinity.mxd



Map Reference: Tax Map, Town of Kearny, Hudson County, New Jersey, November 1, 1984 (Last Revised 1992)



Project Area

**LANGAN**

River Drive Center I  
619 River Drive  
Elmwood Park, NJ 07407  
P: 201.794.6900 F: 201.794.0365  
www.langan.com

NEW JERSEY PENNSYLVANIA NEW YORK CONNECTICUT FLORIDA NEVADA  
No Certificate of Authorization No. 246A27566-000

**TAX MAP**  
KEARNY TOWNSHIP

HUDSON COUNTY		NEW JERSEY	
Project No.	Date	Scale	Figure No.
1872504	6/8/09	1" = 400'	3

G:\Data\1872504\ArcGIS\MapDocuments\Figure 3 - Tax Map.mxd



## **2.0 ARCHAEOLOGICAL MONITORING**

This section discusses the archaeological research design, methodology and results of the archaeological monitoring.

### **2.1 Assessment of Archaeological Resource Sensitivity**

Previous archaeological surveys have been performed within the current archaeological Area of Potential Effect (APE). A low sensitivity for prehistoric and low to none sensitivity for historic archaeological resources was determined (TLC 2008; AKRF 2008). These determinations were based on ARC Tunnel and Portal Bridge projects impacts. The ARC Tunnel project impacts did not exceed the depth of the existing fill layer. Potential impacts need to be further assessed for the Portal Bridge project.

A Phase IA Cultural Resource Survey (Audin 2009) was conducted for the current IRAW project since the excavation depths proposed for this project (approximately 28-feet deep) exceed the depths of the fill layer and may encounter soils amenable to habitation in prehistoric times. The Phase IA concluded that a low sensitivity for Woodland sites and a low to moderate sensitivity for Paleo-Indian to Middle Archaic sites exists in the APE. The report recommended further investigation of the deep sediments was needed to further assess the archaeological potential for this time period and recommended a geomorphological study for the project.

A geomorphological assessment (Stiteler 2010) was conducted for the proposed slurry wall project. Analysis of 60 boring logs and comparison to documented profiles from other parts of the Meadowlands were interpreted to indicate that the SCCC study area was a depositional setting (a combined floodplain of the Passaic and Hackensack Rivers) during a period in the Early to Middle Holocene, when much of the Hackensack River valley was subject to erosion or was a non-depositional setting. The borings were split-spoon cores that were retrieved and logged from the surface to depths ranging from 15 to 61 feet below surface, with the vast majority ranging in depth from 22 to 60 feet. These boring logs revealed a generalized site-wide profile consisting of four stratigraphic units: 1) 6 to 10 feet of man-made placed fill; 2) 3 to 7 feet of estuarine marsh deposits (meadow mat); 3) 3 to 8 feet of sand-dominated alluvium; and, 4) varved glacial lake bed sediments. These profiles were then compared to those reported in local well logs and archaeological, palynological, and geoarchaeological studies conducted in the Meadowlands over the last seven decades. The comparison allowed the study area stratigraphy to be placed within a wider context and allowed radiocarbon and palynological data from the other study sites to be extrapolated to the SCCC study area.

The geomorphological assessment concluded that the project area may have constituted an attractive habitation setting, even into the early Late Holocene, as much of the surrounding area began to be inundated by sea level rise. The assessment concluded that potential exists for the presence of in-situ prehistoric cultural material throughout the 3 to 8 feet of sandy floodplain

alluvium located 9 to 17 feet below surface in the study area, and that this potential may extend into the overlying meadow mat layer.

The Phase IA Cultural Resource Survey concluded that a low archaeological sensitivity for historic archaeological materials exists in the project site. However, a Historic Context Development Report for the Meadowlands Drainage Systems and Features (Hunter 2009) concluded that potential exists on the project site for several historic drainage features. Backhoe trenching was conducted in 2010 to determine if any of these features exist in the proposed slurry wall alignment. The Phase IB Summary Report (Audin 2010) concluded that none of these potential historic features were located within the proposed slurry wall alignment.

## **2.2 Research Design and Methodology**

Several questions were posed when archaeological monitoring was suggested for the construction of the slurry wall. The first was whether – given slurry wall excavation and construction techniques - whether or not archaeological monitoring was technically feasible on such projects. The second question was whether it was possible to collect artifacts from samples taken from the slurry wall excavation. Finally, if sampling is possible, how accurately can vertical provenience be determined if artifacts were recovered?

Recognizing the technical and logistical difficulties presented by attempting controlled archaeological excavation in a contaminated area at and below sea level, the archaeological monitoring program was designed and implemented during construction activities related to the installation of the proposed slurry wall.

In December 2008, a series of 21 borings were conducted by Key Environmental within the slurry wall alignment. These borings were conducted to assess the subsurface conditions and determine the approximate depth of the varved clay, which would serve as the bottom of the slurry wall. These borings were conducted prior to the geomorphological assessment and used in the assessment to estimate the approximate location of the sand layer.

The proposed slurry wall trench is approximately 7,000 linear-feet in length, 3-feet in width, and up to 28-feet in depth. The slurry wall contractor constructed a work platform for the slurry wall excavation and to maintain a level wall for the slurry flow. Slurry was continually pumped into the excavation trench as excavation was taking place. Materials taken from the trench were placed in large dump trucks and taken to one of two consolidation areas (CA) where they were stockpiled.

Archaeological monitoring consisted of obtaining soil samples approximately every 500 feet along the slurry wall alignment, for a total of 14 sampling stations. The excavation at the sampling station was monitored by a Langan archaeologist to assure the appropriate soils were recovered and sampled. When possible a smaller interim sample was taken at the midpoint



between sampling stations to confirm earlier findings. It was anticipated that up to 1.5 cubic yards of soil would be obtained from each sampling station or approximately 30 5-gallon buckets per sampling station for screening purposes (interim samples consisted of approximately 10 buckets).

Langan anticipated collecting soil samples directly from the excavator and having the materials placed into a Langan container (small dump truck or low profile dump trailer). Because it is difficult to see the nature of the material being excavated through the slurry, depths below surface had to be approximated and confirmed by markers such as the presence of the marsh mat in the machine bucket prior to beginning of excavation of the sand layer. The original methodology called for Langan to transport the material to be sampled from the slurry wall to Langan's work area in the dump truck or trailer. A sub-sample was then to be taken and placed in 5-gallon buckets and carried by hand into the designated archaeological screening area.

The soil samples were to be screened for prehistoric artifacts on an archaeological testing platform, a rented 14-foot trailer. After screening, the soils were to be placed in the CA. Potential artifacts recovered were to be bagged and labeled with date, sampling station and recovering personnel's initials, in keeping with standard archaeological field protocols.

A field journal was kept to record all field activities and photographs of field activities and general site views were taken. An archaeological monitoring form was filled out for each sampling location (Appendix B) and included the sample number, the closest slurry wall station number, approximate depth of the sample, number of machine buckets the sample was taken from, number of 5-gallon buckets taken, approximate percentage of gravel, possible artifacts recovered and comments on general conditions of the sample.

A clean area (Photograph 1), where PPE and cleaned samples could be stored, was set up in the northwestern portion of the project site. The clean area consisted of a temporary shelter and parking area for work trucks and crew vehicles. The sites Health and Safety Plan will be followed for the fieldwork portion of the project (PPE, decontamination, disposal, etc.).

## **2.3 Results**

After meeting with the contractor and observing the procedure for the construction of the slurry wall and dumping of excavated materials, several changes were made to the original monitoring plan. The work platform constructed for the excavation and construction of the slurry wall consisted of an earthen level platform that the excavator could work from and keep the slurry from overflowing the excavation. Large dump trucks were used to transport the excavated materials to the CA. The screening trailer ordered for the project was not delivered in December, so a different screening method would be needed.

Fieldwork for the archaeological monitoring originally began on 6 December 2010 and ran until the 10 December. The first sample was recovered on 8 December and processed on 10

December 2010. For this sample two dump truck loads were identified as probable from the excavation team and then dumped in the CA for the archaeologists to take a sample from (Photographs 2 and 3). The sample was delivered to the CA late in the day, so 30 5-gallon buckets were filled up half way and covered with tarps for the night (Photograph 4).

For screening two large aluminum screens were set up on metal saw horses (Photograph 5) in the CA. The screens are made of aluminum stock welded together and have 3/16 wire stainless steel wire mesh on the bottom. The sample material, which was partially frozen, was then pushed through the screens (Photograph 6) with the assistance of a few buckets of water. The water was provided by the site's water truck. The cold temperatures made the screening difficult at best and the partially frozen material had to be defrosted in order to push through the screens. The use of water greatly aided in the screening process but also contributed to the overall discomfort of the screeners. On 18 December 2010 the slurry wall excavation was postponed due to whether impacts on the construction.

The project was started again in March of 2011. The remainder of the field work was conducted from 17 March to 29 April 2011. A total of 14 sampling and 7 interim sampling locations are marked on Figure 4. The slurry wall excavation can be seen in Photographs 7 and 8. The procedure for the dumping of the excavation materials set up in December changed when field work resumed in March. Instead of the dump truck driving into the CA and dumping the materials, the truck now dumped the materials from a ramp at the edge of the CA. This resulted in the excavated materials being dumped from a height of approximately 10-feet, which mixed the sand with the marsh mat and varved clays. After the materials were dumped in the CA a second excavator moved the materials into stock piles, further mixing the sands with the muds, clays and marsh mat. Despite the best efforts of the excavator operator to recover sands for the second primary sample, the sample consisted mostly of muds and sands mixed with some varved clay and was unsuitable for testing purposes.

The solution agreed upon was to have the F-350 with the dump trailer, acquired by Langan, drive up to the work platform and have the excavator load the next sample into the dump trailer. When attempting to implement this methodology it was discovered that the large dump trucks created 3-foot deep ruts in the areas next to the work platform making it impassable for the F-350 and the trailer. The constant rain that fell on the site created large mud areas around the work platform, including the platform itself. When the ground was frozen, as it was in December, this methodology would have worked, but did not work well during the wet spring experienced on the project site.









**Photograph 1 – View of clean area on northwestern portion of the project site, facing west. Pennsylvania Railroad tracks in background. Taken by David Charette.**



**Photograph 2 – Dump truck used to move excavation materials from slurry wall excavation, after dumping sample 1 in consolidation area. Taken by Michael Audin.**





Photograph 3 - View of sample 1 in the Diamond consolidation area, materials in background were used for the work platform. Facing southeast, taken by Michael Audin.



Photograph 4 – Buckets under tarp containing sample 1. Taken by Michael Audin.





Photograph 5 – View of 1 meter by 0.5 meter aluminum screens on metal saw horses. Taken by David Charette.



Photograph 6 – View of working sample material through aluminum screen. Taken by David Charette.



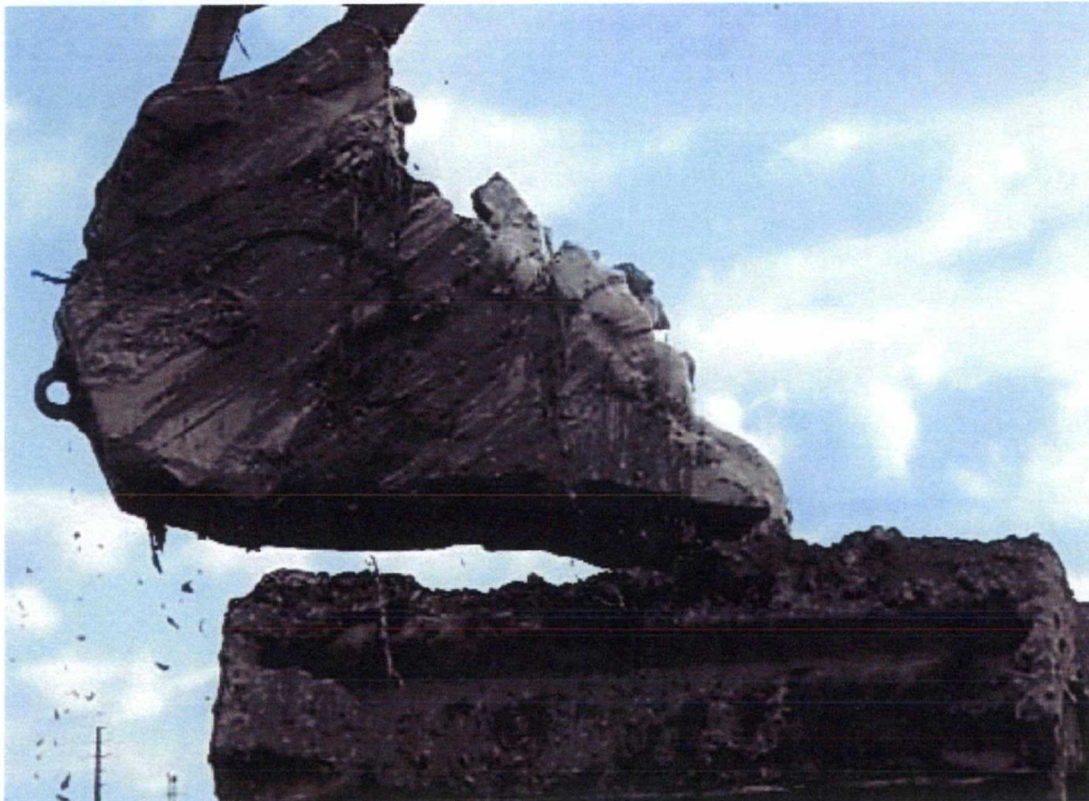


Photograph 7 – View of the slurry wall excavation with slurry in it. Taken by Michael Audin.



Photograph 8 – View of slurry being pumped into the slurry wall trench. Taken by Michael Audin.





**Photograph 9 – View of excavator loading dump truck. Taken by Michael Audin.**



**Photograph 10 – View of excavator placing sample 7 on the work platform 50 feet behind the current excavation. Taken by Michael Audin.**



Since the pick-up truck and trailer could not get close enough to the work platform to procure a sample using this methodology, a new methodology was employed. The excavator operator would now place the excavated sample material on the work platform approximately 50 feet behind the excavator (Photographs 9 and 10). Two or three excavator buckets would be placed on the platform from different depths below surface, allowing for sampling of a greater part of the vertical profile of the sand layer. Material remaining after withdrawal of the sample would be returned to the trench by the excavator and then moved to the dump truck for removal to the CA.

This method resulted in much less mixing of the excavated material. It also allowed for the archaeologists to exercise greater care in collecting the 5-gallon bucket samples on the work platform (Photograph 11). The bucketed samples were then moved to the CA using the pick-up truck and trailer or by hand when the work was close to the CA. The quality of the samples increased dramatically and different layers of the sandy alluvium could be seen in the sample piles. Samples 3, 4, 4i, 5 and 6 were all collected using this methodology. The downfall with this methodology was that in some cases crew members had to make multiple trips, walking long distances, several hundred feet in one case, while carrying a total of 30 heavy buckets to the trailer or the CA. This increased the chance of crew members suffering trip, slip or fall injuries while walking both with the buckets and into muddy areas to get the buckets.

To reduce the risk of these types of injuries a four-wheel drive Kubota (Photograph 12) was rented for the remainder of the project. The Kubota could carry both crew members and up to 16 buckets at one time. The Kubota also allowed the crew to approach the excavator on the work platform from behind and more quickly recover the sample. This reduced time around the excavator allowing the work to progress more smoothly. The four-wheel drive allowed for the Kubota to pass through most muddy areas and could be driven to the edge of the CA to make unloading much easier and less dangerous. After all the sample buckets were brought to the screening area the on-site water truck was contacted to fill 10 – 15 buckets with water to screen the material collected (Photographs 14, 15 and 16). A PID was also brought into the CA to monitor for air quality (Photograph 13) during screening.

Once the sample materials were brought into the CA the screening process was fairly consistent. Originally it was thought that the CA would contain too much contaminated material to allow for the screening to be conducted in the CA, which is why the screening trailer was ordered. It was determined that it was possible for the screening to be done in the CA with air monitoring. This allowed for a shorter clean up time and reduced the risk of contamination to the field crew. The large screens on saw horses allowed for a large degree of flexibility in moving from one CA to the other.





Photograph 11 – View of loading sample 10 into bucket on the work platform 50-feet behind the excavation. Pipe provides the slurry for the wall. Taken by Michael Audin.



Photograph 12 – View of the 4-wheel drive Kubota. Taken by Michael Audin.





Photograph 13 – View of PDA being unloaded by the CA on the eastern portion of the project site. The PID attached to the bucket is for air monitoring. Taken by John Stiteler.



Photograph 14 – View of half full sample buckets before screening. Taken by Michael Audin





Photograph 15 – View of moisture rising to the top of the sample. Taken by Michael Audin



Photograph 16 – View of buckets waiting for the water truck at the western edge of the eastern CA, facing northwest. Taken by Michael Audin.



For the screening of the sample materials the buckets of sample material and the buckets of water were set on different sides of one of the large aluminum screens (Photograph 17). One crew member poured the material into the screen and then both crew members pushed the material through the screen. As the screen became clogged the second crew member would pour water, using 2 pots for plants turned to reduce the hole size at the bottom and control the water flow, over the material (Photograph 18). The water assisted in moving the sand and silt through the screen and left any artifacts or gravel in the screen. Photographs 19 through 21 show how the screening process reduced the amount of sand to reveal the gravel or artifacts in the sample. The results of each sample are discussed in the next section, section 2.4.

Initially, slightly modified standard archaeological screening procedures were employed: sample material was processed through the screens to remove soil matrix; the remaining material was washed in the screen to remove a muddy film; and examined for the presence of cultural material, which was then removed and bagged and the remaining gravel, coal cinder, etc. discarded. Approximately halfway through the project (following processing of Samples 1 through 8i), a decision was made to retain and bag separately all material remaining in the screen following examination and removal of cultural material. This was implemented for several reasons. It was observed that angular diabase that did not appear to have a prehistoric cultural affiliation was present in samples in various parts of the site. Much of this was interpreted to be modern road base, railroad grade ballast, etc. When it became apparent that the vast majority of prehistoric debitage being recovered was diabase, a decision was made to retain all diabase fragments. Upon reflection, the decision was revised to include all material remaining in the screen. This would allow for subsequent comparison of all diabase fragments, allow for an objective (e.g., volume or weight) rather than subjective (e.g., "small amount") assessment of the content of gravel, coal cinder, etc. across the site, and allow for detailed examination of characteristics such as evidence of water transport, etc.





Photograph 17 – View of screening set up in the eastern CA, sample buckets are to the right and the water buckets are to the left, facing southeast. Taken by Michael Audin.



Photograph 18 – View of water being poured over materials left in the screen. Taken by Michael Audin.





Photograph 19 – View of material from bucket before screening. Taken by Michael Audin.



Photograph 20 – View of material (from sample 11) left in screen after the above sand is passed through the screen before water screening. Taken by Michael Audin.





Photograph 21 – View of material (from sample 11) left in screen after the water screening.  
Taken by Michael Audin.



Photograph 22 – View of varved clay located below the sand layers. Taken by Michael Audin.



## 2.4 Samples

This section contains a brief review of the results of each sample screened. There are several issues to keep in mind when reviewing the results of the sampling. First, the depth below surface is measured from the top of the work platform constructed to complete the project. In most cases this platform raised the current topography of the project site from one to several feet in height, especially in the southern portion (Beazer Site) of the slurry wall where up to eight feet of material has already been stockpiled from previous projects on that site. Second, because it was impossible to see through the slurry the sand layers were found by combination of estimating of depth of the excavator arm and observations of the materials preceding the sand layers coming out of the excavation trench being put into the dump trucks. The high level of experience of the excavator operator made this process much easier to recover the sand layers. Third, the exact depth of the sand layers could not accurately be measured and had to be estimated by the known reach of the excavator during the excavation of the sample. Fourth, because the excavator pulls the soils over a ten foot area of the trench only the general ten foot location was used to document the approximate locations of materials recovered. Lastly, because of slumpage in the upper part of the excavation, contamination of the sample was almost impossible to avoid.

### Sample 1

Sample 1 was recovered in the northeast corner of the project site near the Portal Bridge and the Hackensack River (Figure 4). The closest slurry wall station to the sample location was 20+80. The depth of the sample was estimated at between 17 to 20 feet below surface. The sample consisted of approximately 30 5-gallon buckets half full of material. The soil texture was sand to loamy sand with some estuarine muds. Gravel comprised less than 0.5% of the total sample and was small to medium in size. No prehistoric materials were recovered from the sample.

### Sample 2

Sample 2 was recovered along the northern portion of the project site. The sample was taken between stations 16+60 and 16+35. The estimated depth of the sample was between 16 to 20 feet below surface. The sample consisted of approximately 30 5-gallon buckets half full of material. The soil texture was sand to loamy sand with some estuarine muds, marsh mat and varved clay mixed in. Gravel comprised less than 0.5% of the total sample and was small to medium in size. No prehistoric or historic materials were recovered from the sample. Overall the sample was poor in quality because of the mixing in the truck and the high drop point into the CA (this was the only sample to use this method for recovery).

### Sample 3

Sample 3 was recovered along the northern portion of the project site. The sample was taken between stations 11+20 and 11+10. The depth of the sample was estimated between 16 to 21 feet below surface. The sample consisted of approximately 30 5-gallon buckets half full of sandy material. The soil texture was coarse to fine sands with some marsh mat mixed in. The



sands were Munsell Color code 2.5Y4/2 – 6/2 (dark grayish brown to light brownish gray) with a few pockets of 10YR4/3 (brown). Gravel comprised less than 0.5% of the total sample and was small to medium in size. No prehistoric or historic materials were recovered from the sample. Overall the sample was of high quality and was the first sample to be taken directly on the work platform.

#### Sample 4

Sample 4 was recovered along the northern portion of the project site. The sample was taken between stations 6+00 and 5+90. The depth of the sample was estimated between 16 to 21 feet below surface. The sample consisted of 31 5-gallon buckets half full of sandy material. Texture ranged from fine to medium sandy loam to fine to medium loamy sand. The sands were Munsell color Code 2.5Y4/2 – 6/2 (dark grayish brown to light brownish gray) with a few pockets of 10YR4/3 (brown). Gravel constituted less than 0.5% of the sample by volume and ranged in size from very fine to medium and was nearly all rounded. A small amount of subangular to subrounded red shale and red siltstone was also present. Coal cinder was present in about three quarters of the bucket samples. One modern button was recovered. Fifteen to twenty thin flakes of mica ranging from 1 to 4 cm in the long axis were also recovered. Mica was recovered only from Sample 4 and may be an industrial waste product.

#### Sample 4i

Sample 4i was an interim sample that was recovered along the northern portion of the project site between samples 4 and 5. The sample was taken between stations 3+00 and 2+90. The depth of the sample was estimated between 18 to 23 feet below surface. The sample consisted of approximately 10 5-gallon buckets half full of sandy material. The material deposited by the excavator was gleyed sandy loam and appeared to be largely from the upper part of the soil column. The soils were Munsell Color code 2.5Y4/2 – 5/2 (dark grayish brown to grayish brown) in color. Gravel comprised less than 0.5% of the total sample and was fine to medium in size. No prehistoric materials were recovered from the sample. Historic elements found in the sample include clinker, cinder and a walnut sized piece of red brick.

#### Sample 5

Sample 5 was recovered along the northern portion of the project site. The sample was taken between stations 1+05 and 0+95. The depth of the sample was estimated between 18 to 23 feet below surface. The sample was drawn from four excavator-bucket loads, one of which included varved clay and one of which contained marsh mat. The texture of the entire sample withdrawn for testing was fine sand to loamy fine sand. The sands were Munsell Color code 2.5Y4/2 – 5/2 (dark grayish brown to grayish brown) in color. Content of water-rounded gravel was less than 0.5% overall and some buckets contained no rounded gravel at all. Rounded gravel was mainly fine to medium in size; a few small subrounded to rounded cobbles were also present. There was a significant component of historic to recent material in the sample. This included one piece of recent brown bottle glass and numerous pieces of coal cinder. Subangular, weathered red shale and angular and subangular diabase gravel (possibly road base



material) was present in many buckets, as was yellow-green chromium waste. The sample seems to represent a large portion of the sand column.

#### Sample 6

Sample 6 was recovered along the western portion of the project site, which roughly parallels the Belleville Turnpike (Route 7). The sample was taken between stations 65+00 and 64+90. The depth of the sample was estimated between 16 to 19 feet below surface. The sample consisted of 30 5-gallon buckets half full of sandy material. The soil texture was fine to medium sands with a relatively high content of silt. The sands were Munsell Color code 2.5Y2/0 (black) in color close to station 65+00 and were Munsell Color Code 2.5Y4/4 (olive brown) in color by station 64+90. Content of rounded gravel, while still less than 1.0% by volume, was higher than in previous samples. Size of the rounded gravel ranged from fine to large and several small rounded cobbles were also present. The soils had a heavy organic or chemical smell and might be contaminated soils. One possible prehistoric flake was recovered from the sample. Historic elements were found in more than half of the bucket samples and included coal clinker, coal cinder, brown bottle glass, clear window glass, small brick fragments, a short piece of steel rod and one wire nail. The high gravel content, coupled with the dark discoloration and strong organic smell, suggests that a flood chute or swale may have been present in this area. Periodic high energy flood flows may have deposited gravel or winnowed sandy alluvium, increasing relative gravel content within such a flood chute, followed by slackwater accumulation of silt and organic material. Such a swale may have been present prior to introduction of fill during the historic period and the high content of historic to recent material may have been water-transported or may have been directly deposited into the swale.

#### Sample 6i

Sample 6i was an interim sample that was recovered along the western portion of the project site between samples 6 and 7. The sample was taken between stations 62+50 and 62+40. The depth of the sample was estimated between 15 to 18 feet below surface. The sample consisted of 10 5-gallon buckets half full of sandy material. The soil texture was sand with some fine sandy loam. The sands were Munsell Color code 2.5Y4/2 (dark grayish brown) and 10YR4/4 (dark yellowish brown) in color. Gravel comprised less than 0.5% of the total sample and was fine to large in size with a few small cobbles. No prehistoric materials were recovered from the sample. Historic elements found in the sample include 5 to 10 pieces of brown and clear bottle glass. The sample contained less gravel than sample 6, but did include several pieces of granite in the form of large subangular gravel.

#### Sample 7

Sample 7 was recovered along the western portion of the project site just north of the gatehouse for the former Edison property. The sample was taken between stations 59+90 and 59+80. The depth of the sample was estimated between 15 to 18 feet below surface. The sample consisted of 30 5-gallon buckets half full of sandy material. The soil texture was fine to coarse sand and the entire sample was gleyed to heavily reduced. The sands were Munsell Color code 2.5Y3/2 to 4/2 (very dark grayish brown to dark grayish brown) in color. Gravel



comprised less than 0.5% of the total sample and was small to medium in size with a few small cobbles. Ten possible prehistoric flakes were recovered from the sample, nine made of diabase and one made of quartzite. Historic elements found in the sample include clinker, coal cinder, and bottle glass.

#### Sample 8

Sample 8 was recovered along the western portion of the project site where the SCCC site and the Beazer site meet. The sample was taken between stations 55+10 and 55+00. The depth of the sample was estimated between 15 to 18 feet below surface. The sample consisted of 30 5-gallon buckets half full of sandy material. The soil texture was medium to coarse sand, much of it structureless (single-grained). Several buckets included estuarine mud and phragmites tubers. The sands were Munsell Color code 2.5Y3/2 and 10YR4/4 (very dark grayish brown and dark yellowish brown) in color. Gravel comprised less than 0.5% of the total sample and was very fine to medium in size. Seven possible prehistoric flakes were recovered from the sample, two made of diabase, one made of white quartz and one made of quartzite; a possible exhausted core made of diabase was also recovered. Historic elements found in the sample include glass and brick and were present in at least half of the sample buckets.

#### Sample 8i

Sample 8i was an interim sample that was recovered along the western portion of the project site between samples 8 and 9. The sample was taken between stations 52+80 and 52+70. The depth of the sample was estimated between 15 to 18 feet below surface. The sample consisted of approximately 10 5-gallon buckets half full of sandy material. The soil texture was fine to coarse sand. The sands were Munsell Color code 2.5Y4/2 – 3/2 (dark grayish brown to very dark grayish brown) in color. Gravel comprised less than 0.5% of the total sample and was small to medium in size. No prehistoric materials were recovered from the sample. Historic elements found in the sample include brick, clinker, coal, coal cinder and glass all in a higher concentration than sample 8.

#### Sample 9

Sample 9 was recovered along the western portion of the project site. The sample was taken between stations 50+00 and 49+90. The depth of the sample was estimated between 15 to 18 feet below surface. The sample consisted of approximately 30 5-gallon buckets half full of sandy material drawn from two excavator-bucket loads which appeared to have come from the top and middle of the sandy stratum. The soil texture was very fine to coarse sand but was predominantly fine to medium sand. The sand was Munsell Color code 2.5Y4/1 to 4/2 (dark gray and dark grayish brown) in color. Gravel comprised less than 0.5% of the total sample and was very fine to medium in size, all rounded to subrounded (Photograph 23). No prehistoric materials were recovered from the sample. Historic elements found in the sample include coal cinder, brick, colored bottle glass and glass. Bottle glass was present in nearly every sample bucket.



#### Sample 10

Sample 10 was recovered along the southern portion of the project site. The sample was taken between stations 44+70 and 44+40. The depth of the sample was estimated between 20 to 23 feet below surface. The sample consisted of 30 5-gallon buckets half full of sandy material. The soil texture of the sample buckets included was fine to coarse sand, loamy sand with silt and very fine organic matter, and gleyed silt and very fine sand (estuarine mud). The sands were Munsell Color code 2.5Y5/6 and 2.5Y4/2 - 5/2 (light olive brown and dark grayish brown to grayish brown) in color. The gravel content was the lowest of any sample to that point and consisted of rounded very fine and fine pieces with only a few medium pebbles. No diabase was present in any form. No prehistoric materials were recovered from the sample. Historic elements found in the sample include coal cinder and glass but in lower concentrations than in sample 9.

#### Sample 10i

Sample 10i was an interim sample that was recovered along the southern portion of the project site between samples 10 and 11. The sample was taken between stations 41+90 and 41+70. The depth of the sample was estimated between 20 to 23 feet below surface. The sample consisted of approximately 10 5-gallon buckets half full of sandy material. The soil texture was fine to coarse sands. The sands were Munsell Color code 10YR4/4 and 2.5Y4/2 - 3/2 (dark yellowish brown and dark grayish brown to very dark grayish brown) in color. Gravel comprised less than 0.5% of the total sample and was small to medium in size (Photograph 24). No prehistoric materials were recovered from the sample. Historic elements found in the sample include asphalt, coal cinder, slag, brick and clear, brown and green bottle glass.

#### Sample 11

Sample 11 was recovered along the southern portion of the project site. The sample was taken between stations 39+20 and 39+00. The depth of the sample was estimated between 17 to 20 feet below surface. The sample consisted of 30 5-gallon buckets half full of sandy material. The excavator-bucket loads from which the sample was drawn included both varved clay and the base of the meadow mat and the screened sample included sand associated with each. The soil texture was loamy very fine sand to medium sands. The sands were Munsell Color code 2.5Y4/2 (dark grayish brown) in color. Gravel comprised less than 0.1% of the total sample and was all rounded and very fine to fine in size. No prehistoric materials were recovered from the sample. Historic elements found in the sample include coal, brick and glass. The glass was observed in more than half of the 30 buckets screened.





Photograph 23 – View of gravel from sample 9. Taken by Michael Audin



Photograph 24 – View of gravel from sample 10i. Taken by Michael Audin.



#### Sample 11i

Sample 11i was an interim sample that was recovered along the southern portion of the project site between samples 11 and 12 just west of the point at which the slurry wall turns to the north. The sample was taken between stations 37+90 and 37+70. The depth of the sample was estimated between 18 to 20 feet below surface. The sample consisted of approximately 10 5-gallon buckets half full of sandy material, all drawn from a single excavator-bucket load. The soil texture was very fine to fine sands, heavily reduced and containing a large amount of very fine organic matter. The sands were Munsell Color code 2.5Y4/2 – 5/2 (dark grayish brown to grayish brown) in color. Gravel comprised less than 0.1% of the total sample and was fine to large in size with several round cobbles (Photograph 25). No prehistoric materials were recovered from the sample. Historic elements found in the sample include the highest content of coal cinder seen to this point and a few small pieces of glass. No diabase was present in any form.

#### Sample 12

Sample 12 was recovered along the eastern portion of the project site along the shore line of the Hackensack River. The sample was taken between stations 35+00 and 34+90. The depth of the sample was estimated between 18 to 21 feet below surface. The sample consisted of approximately 30 5-gallon buckets half full of sandy material. The soil texture was fine to medium loamy sands. The sands were Munsell Color code 2.5Y4/2 – 5/2 (dark grayish brown to grayish brown) in color. Gravel comprised less than 0.5% of the total sample and was fine to medium in size. A total of 22 possible prehistoric flakes were recovered from the sample. Historic elements found in the sample include coal cinder, brick, slag, ceramics and glass in increasing concentrations.

#### Sample 12i

Sample 12i was an interim sample that was recovered along the eastern portion of the project site along the shore line of the Hackensack River between samples 12 and 13. The sample was taken between stations 32+00 and 31+90. The depth of the sample was estimated between 18 to 21 feet below surface. The sample consisted of approximately 10 5-gallon buckets half full of sandy material. The soil texture was fine sandy loam to medium sandy loam. The sands were Munsell Color code 2.5Y7/2 to 4/2 (light gray to dark grayish brown) in color. Gravel comprised less than 0.1% of the total sample and was very fine to medium in size. A total of 8 possible prehistoric flakes were recovered from the sample. Historic elements found in the sample include coal cinder, brick and three pieces of glass.





Photograph 25 – View of gravel from a bucket of sample 11i. Taken by Michael Audin.



Photograph 26 – View of gravel from a bucket of sample 14 with a possible diabase flake in view.  
Taken by Michael Audin.



### Sample 13

Sample 13 was recovered along the eastern portion of the project site along the shore line of the Hackensack River. The sample was taken between stations 30+00 and 29+90. The depth of the sample was estimated between 18 to 21 feet below surface. The sample was drawn from one excavator-bucket load and consisted of 30 5-gallon buckets half full of sandy material. A small amount of meadow mat was included in the excavator-bucket load, suggesting that the sample represented the top and middle of the sandy stratum. The soil texture was very fine sandy loam to loamy medium sand, all heavily reduced. The sand was Munsell Color code 2.5Y7/2 to 4/2 (light gray to dark grayish brown) in color. Gravel comprised less than 0.5% of the total sample and was very fine to medium in size. A total of 40 possible prehistoric flakes were recovered from the sample. Most of the flakes are diabase with at least three made of quartzite. Historic elements found in the sample included a small amount of coal cinder, brick, slag, and fine coal fragments. Two pieces of window glass, one piece of clear ribbed glass, and two pieces of brown bottle glass (one water-rounded) were recovered.

### Sample 13i

Sample 13i was an interim sample that was recovered along the eastern portion of the project site along the shore line of the Hackensack River between samples 13 and 14. The sample was taken between stations 27+80 and 27+60. The depth of the sample was estimated between 18 to 21 feet below surface. The sample, drawn from a single excavator-bucket load, consisted of 11 5-gallon buckets half full of sandy material. The soil texture was loamy fine sand to medium loam. The sand was Munsell Color code 2.5Y7/2 to 4/2 (light gray to dark grayish brown) in color. Gravel comprised less than 0.5% of the total sample and was very fine to medium in size. A total of 21 possible prehistoric flakes were recovered from the sample. All the flakes were of diabase except for one made of quartz. Historic elements found in the sample include coal cinder and brick. No glass was observed in the sample.

### Sample 14

Sample 14 was recovered along the eastern portion of the project site along the shore line of the Hackensack River within 400 feet of the Portal Bridge. The sample was taken between stations 25+00 and 24+90. The depth of the sample was estimated between 18 to 21 feet below surface. The sample consisted of 30 5-gallon buckets half full of sandy material. The soil texture was very fine sandy loam to loamy medium sand; much of the sample was heavily reduced with high silt content and appeared to come from near the top of the stratum. The sand was Munsell Color code 2.5Y7/2 to 4/2 (light gray to dark grayish brown) in color. Gravel comprised less than 0.5% of the total sample and was fine to medium in size (Photograph 26). A total of 23 definite flakes and 46 possible prehistoric flakes were recovered from the sample, mostly made from diabase. Historic elements found in the sample included brick, coal cinder, clinker, and three pieces of glass - two clear ribbed fragments and one piece of green bottle glass.



Samples 13i and 14 recovered the highest concentration of possible prehistoric flakes on the project site. To the south, Samples 13, 12i and 12 also yielded smaller quantities of prehistoric flakes. Overall, the shoreline area along the Hackensack River demonstrated the greatest concentration of lithic materials from the sandy alluvium layer at a depth of 9 to 17 feet below surface on the project site.

## **2.5 Lithic analysis**

The archaeological monitoring resulted in the recovery of approximately 200 possible lithic flakes, debitage and one possible core for further analysis. The majority of the artifacts were recovered from the eastern and western alignments of the slurry wall. No flakes were recovered from the northern alignment of the slurry wall. This could be for different reasons: one is that the subangular material found in this area was considered historic and attributed to the railroad bed to the north of the project site; another is that the recovery methodology was still a work in progress and the earlier methodology did not work. In addition no flakes were recovered from the southern alignment of the slurry wall. This is most likely because of the earlier remediation conducted on the Seaboard site. Because of the nature of the slurry wall and the inability to see in or through the slurry, provenience for artifacts is general at best.

In general the flakes recovered have been broken from natural activities or are debitage. The majority of the flakes recovered are not easily identifiable. Many are subangular and blocky in nature and are mostly small. Some flakes seem to have been broken (missing platform etc.) after they were created. Whether this is from natural or man-made activities is unknown. Only one identifiable lithic artifact, the micro core found in sample 8, was recovered during the monitoring. This sampling location was along the western edge of the project site close to Bellville Turnpike.

After further analysis the number of flakes and potential flakes was reduced to a total of 47 flakes, 99 possible flakes and a micro core. The highest density of lithics was recovered along the Hackensack River in Samples 12, 13, 13i, and 14 on the eastern edge of the project site. A total of 133 different flakes and potential flakes were recovered in this area. Sample 14 yielded the highest density of lithics with a total of 69 flakes and potential flakes. This sample was located the closest to the current portal bridge and was almost directly across the River from Snake Hill, a possible lithic source for many of the flakes found during the archaeological monitoring. Table 1 lists the location, material and quantity of the flakes recovered during the archaeological monitoring.



Table 1. Location, material and quantity of lithic materials.

Sample #	Material	Quantity	Comments
6	Quartzite	1	Flake
6	Diabase	1	Flake
7	Diabase	3	Flakes
7	Diabase	3	Possible Flakes
8	Diabase	3	Flakes
8	Quartzite	1	Flake
8	Diabase	1	Micro Core
10	Diabase	1	Flake
12	Diabase	7	Flakes
12	Quartz	1	Flake
13	Diabase	2	Flakes
13	Diabase	36	Possible Flakes
13i	Diabase	4	Flakes
13i	Diabase	13	Possible Flakes
13i	Quartz	1	Possible Flake
14	Diabase	21	Flakes
14	Quartzite	1	Flake
14	Black Chert	1	Flake
14	Diabase	46	Possible Flakes
Total Lithics		147	Flakes, Possible Flakes and Micro Core

This assemblage of lithic materials was reviewed by Jack Cresson, an archaeologist and lithic analyst, to independently verify that the assemblage was in fact cultural in nature. Jack Cresson's analysis, sent by e-mail after reviewing the materials, is copied below. Photographs 27 through 35 show the lithic and possible lithic artifacts recovered during the archaeological monitoring and reviewed by Jack Cresson.

On Wednesday May 25, 2011 I conducted an examination of miscellaneous lithic materials for Michael Audin of Langan Engineering and Environmental Services, Inc., found during a project entitled "Archaeological Monitoring for the SCCC Interim Remedial Action Work Plan".

I examined a group of lithic assemblages recovered from deep, submerged contexts, ca. 15 to 20 feet below the NJ Meadowlands. These assemblages were collected from mechanical bulk samples taken at approximate 500-foot interval sampling (with some interim samples at 250-feet) that targeted a known, buried, beach terrace horizon-a landform of ancient geological origins.

It was found that many of these assemblages contained actual artifact evidence in the form of flakes and in one instance a micro core. These artifacts exhibited



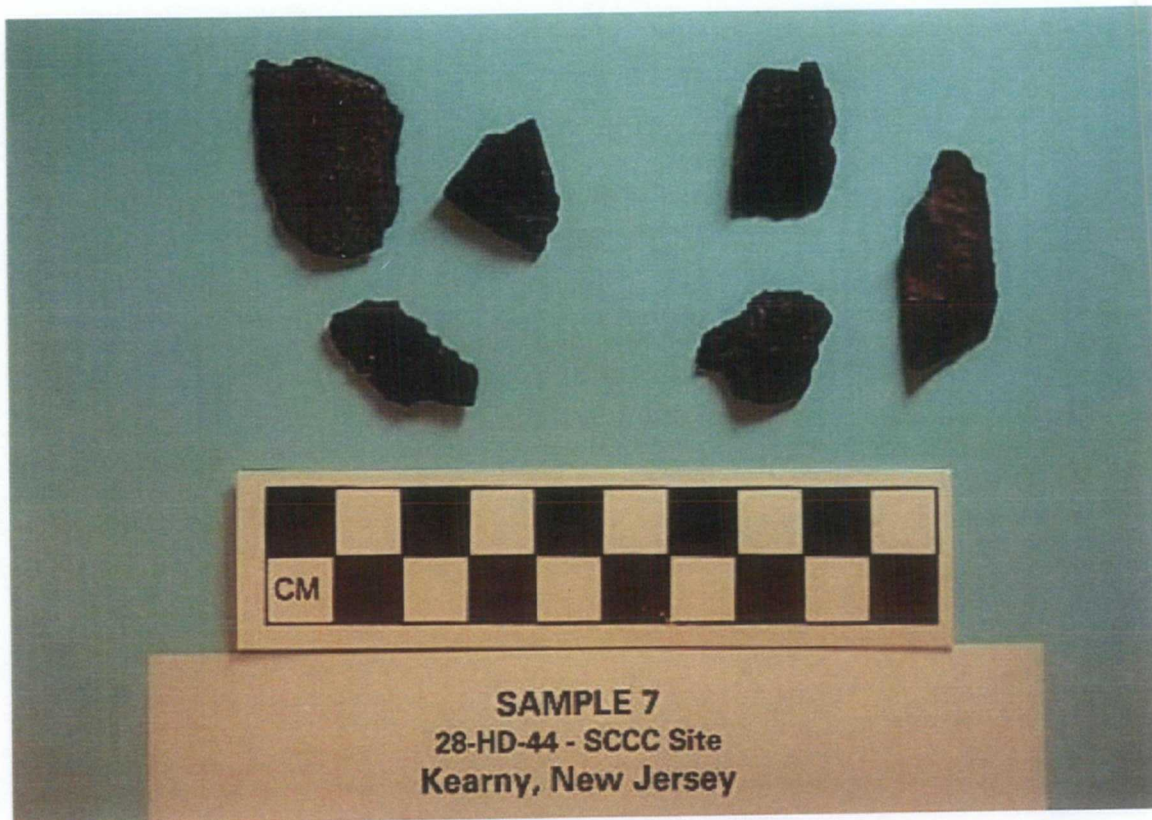
diagnostic attributes (flake formation processes) in various lithic materials, of which local diabase was dominate. Also, other more typical lithic materials were present, including quartz, quartzite and chert. Of note, various flake attributes were recognized and include prepared platforms, platform bulbs of percussion, errailures, loading over ridges and serial flake detachments. One compelling specimen, the micro core noted above and made of diabase, exhibited multiple flake removals from a single platform surface. All of this seems to show unequivocal evidence that prehistoric tool making activities are present within the targeted contexts.

Respectfully submitted,  
Jack Cresson,  
Archaeologist and Lithic Analyst



Photograph 27 – Sample 6 artifacts.



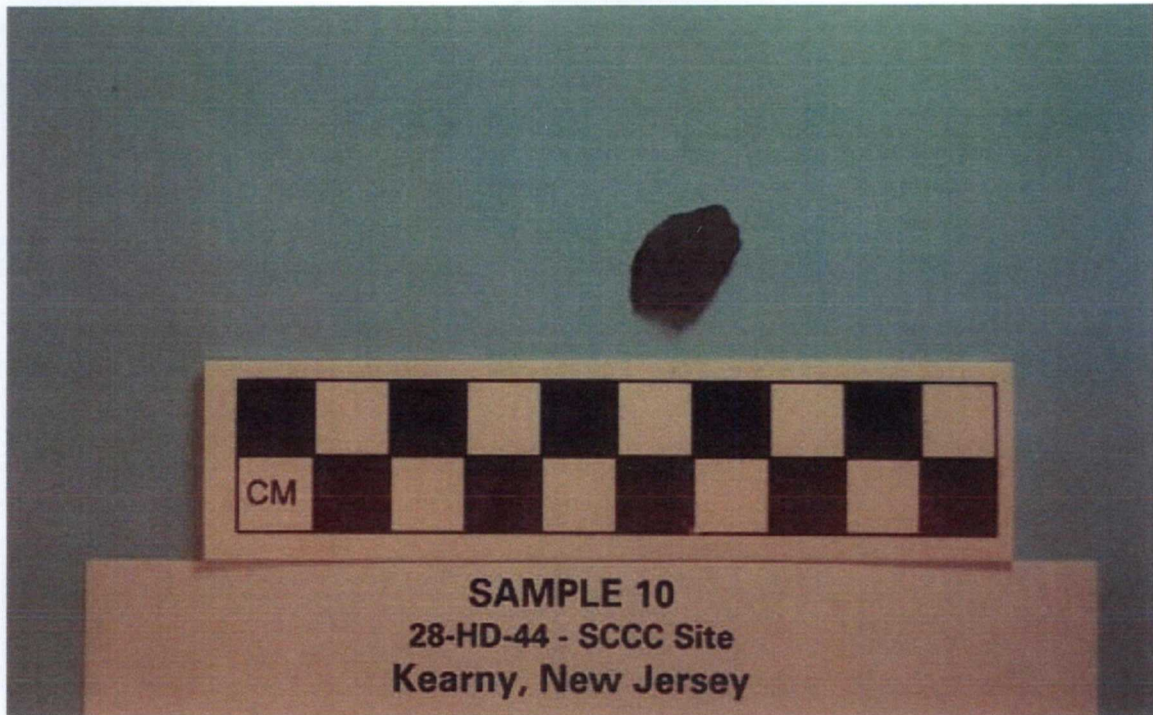


Photograph 28 – Sample 7 artifacts.



Photograph 29 – Sample 8 artifacts, micro core is on the left.





Photograph 30 – Sample 10 artifact.



Photograph 31 – Sample 12 artifacts.





Photograph 32 – Sample 13 artifacts, definite flakes are to the bottom right.



Photograph 33 – Sample 13i artifacts, definite flakes are to the right.





Photograph 34 – Sample 14 definite flakes.



Photograph 35 – Sample 14 possible flakes.



## **2.6 Discussion**

Several questions were posed in Section 2.2. The first was whether archaeological monitoring could be done on slurry wall projects. The answer to this question is yes it can be done. The second question was is it possible to collect artifacts from samples taken from the slurry wall excavation? Once again the answer is yes they can.

The final question was how accurate would the provenience be if artifacts could be recovered? This question is not as simple to answer as the first two. The accuracy depends on several factors during the excavation. One is the estimated beginning, ending and depth of the machine arm of the excavator. This requires a machine operator that is not only good at excavating, but can also communicate what they are doing to the monitoring team. In general for this project, vertical provenience was estimated by the depth of the excavator machine arm. Horizontal provenience was determined by measuring with a handheld measuring tape from a station marker to the beginning and ending of the machine cut. This produced a roughly 10 foot long area of location with a depth within a range of 3 to 5 feet.

For any future projects we would recommend modifying the methodology in several ways to both improve randomness of the testing and the provenience ranges. Unlike a standard Phase I, II, or III survey, an archaeological monitoring project is generally an adjunct to a larger construction project and, as such, is subject to the timing (and delays) of the larger project. To increase the number of samples and reduce down-time for the archaeological team in future projects, we recommend that a sample be taken at the beginning of each day, with supplemental samples taken as time and on-site conditions allow. This will also result in a more randomized sample since the distance excavated varies from day to day.

One way to improve controls on vertical provenience is to have any borings conducted in the slurry wall alignment monitored by the project geomorphologist and continuously sampled to create a stratigraphic sequence for the project. The borings for the current project were completed before the geomorphologist was brought on to the project. By having the borings monitored by the geomorphologist the stratigraphic sequence could be charted. Then the soil color of the soil matrix mixed with the artifacts in the screen could be compared to this sequence to produce a more accurate vertical provenience.

## **2.7 Radiocarbon Dating**

In June 2011 an organic sample was obtained from the peat (meadow mat) layer in the course of supplemental trenching at the western side of the project area, near Sta 61+00 and between the locations of Samples 6i and 7. The organic sample was obtained from an excavator bucket load of material immediately after being removed from the trench. The sample was taken from an area of the excavated material where the peat was in direct contact with reduced sandy clay loam in what was judged to be an intact stratigraphic relationship representing the base of the peat deposit. As noted previously, trench excavation methodology precluded direct



measurement of the depth below surface from which samples were retrieved. An estimate was made in the field that the organic sample was obtained at 15 to 18 feet below surface (including the thickness of the work platform – approximately 2 feet), equating to 6 to 9 feet below modern sea level. Profiles of geotechnical borings previously conducted by others (reported in Audin 2009 and Stiteler 2010) indicate that the meadow mat is 4 to 5 feet thick in this part of the study area. For the purposes of this study, the highly organic meadow mat is assumed to have undergone some degree of compression by the weight of the overlying fill. The uncompacted, pre-fill meadow mat is assumed to have extended slightly above modern mean sea level (msl) and thus to have been 6 to 9 feet thick.

In August 2011 a subsample of the organic sample was submitted to Beta Analytic in Miami, Florida for radiocarbon dating. The sample yielded a conventional radiocarbon age of 840 +/- 30 BP, a calibrated (2 sigma) date of AD 1160 to 1260 (Beta Analytic 2011) (Appendix E). Based on the stratigraphic position of the peat sample, this is interpreted to reflect the time at which rising sea level inundated the surface from which the sample was obtained, the point at which the sub-aerial terrestrial surface transitioned to an estuarine marsh setting unsuited to human habitation.

Radiocarbon dates have been obtained on peat samples in conjunction with a number of archaeological, geoarchaeological, palynological, and geomorphological research projects previously carried out in the Hackensack Meadowlands. Heusser, conducting research in a former cedar bog near Secaucus, obtained a radiocarbon date of 2025 +/- 300 year BP from the base of a 3.3 meter (10.8 feet) core (Heusser 1963). The cores from the 1963 study were subjected to both macrofossil and pollen analysis, revealing that alder and birch pollen were dominant in the lowest levels of the peat but that the fibrous mass of the basal peat was dominated by sedge. Based on the radiocarbon date and 3.3 meter (10.8 feet) thickness of the peat overlying lake clays, Heusser posited a 3 meter (9.8 feet) rise in sea level over the last 2000 years.

Carmichael conducted pollen, spore, macrofossil, and foraminifera analysis on a 3.8 meter (12.5 feet) core of peat from a sampling location 20 meter west of the Hackensack River channel near the New Jersey Route 3 crossing of the Hackensack River, 6 miles north of the SCCC study area (Carmichael 1980). In addition to palynological information, the core yielded a radiocarbon date of 2610 +/- 130 year BP from the contact with gray basal clay at the base, closely correlating with the date at Heusser's Secaucus site which is 1.2 miles to the southeast. Birch pollen was prominent in this sample. Carmichael also reported a date of 2060 +/- 120 year BP from a depth of about 2.8 meter (9.2 feet) below surface from this core. Subsequent changes (reflected by seven different plant assemblages) were ascribed to oscillating tidal influence, which became steadily more significant after about 1800 BP.

Geoarchaeological studies were conducted in the Meadowlands by Geoarcheology Research Associates in the early 1990s (Schuldenrein 1995; Thieme and Schuldenrein 1996). Schuldenrein 1995 describes the detailed stratigraphy from a boring adjacent to Bellman's



Creek (NC-04) near Carlstadt. One meter of fluviatile sand encountered beneath approximately 2 meter (6.6 feet) of peat or meadow mat was interpreted as localized deposition perhaps related to higher-energy inundations at the Bellmans Creek/Hackensack River confluence (Schuldenrein 1995) prior to inception of marsh formation. The fluviatile sands were underlain by limnic and organic clays. A date of 930 $\pm$ 50 BP was obtained from a depth of 1.1 meter (3.6 feet) below msl within the meadow mat near Bellman's Creek (Schuldenrein 1995). A "very tentative assignment of an Early Holocene date" was assigned to the fluviatile sands "predicated on the stratigraphic ordering of the unit between the [underlying] lacustrine unconformity and the earliest dated peats at North Arlington at ca. 5500 BP" (Schuldenrein 1995).

The mid-Holocene date on the basal peat at North Arlington referred to in Schuldenrein 1995 is reported in Thieme and Schuldenrein 1996. In that study, conducted along the western boundary of the Hackensack Meadowlands, a date of 5030 $\pm$ 160 year BP was obtained from a depth of 3.0 to 3.7 meter (9.8 to 12.1 feet) below surface in an area where the transition from peaty material to varved clays, with no intervening sandy alluvium, occurs at 3.7 to 5.2 meter (12.1 to 17.1 feet) (Thieme and Schuldenrein 1996).

Numerous authors (e.g., Heusser 1963; Carmichael 1980; Thieme and Schuldenrein 1996; Thieme 2003) make reference to a problematic gap in the sediment record of the Hackensack Meadowlands. Although sandy or silty deposits have been reported overlying the lake-bed clays (e.g., Heusser 1949; Schuldenrein 1995; Rue and Traverse 1997), these appear to be limited in lateral extent and thickness. In many cores obtained throughout the area, organic-rich estuarine marsh deposits directly overlie the varved clays of the Lake Hackensack bed.

Several hypotheses have been advanced to explain the relative lack of Early and Middle Holocene sediments in the Meadowlands. Heusser posited a mid-Holocene marine transgression that eroded any previously-emplaced alluvium, followed by a regression that allowed the development of freshwater swamps and bogs before the Late Holocene development of estuarine conditions (Heusser 1949, 1963). Carmichael supports the idea of erosion by a marine transgression but also puts forth the possibility of fluvial erosion of the surface by broad, south-flowing channels formed in the lake clays, noting that "this fluvial erosion must have necessarily encompassed large areas, for previous studies indicate the presence of clay (blue mud) under peat at depths comparable to this site" (Carmichael 1980). Averill et al., in describing the reestablishment of south flowing drainage in the Hackensack River system following isostatic rebound, state that erosion dominated throughout the valley in that period (Averill et al. 1980). They place the reestablishment of through-flowing south drainage at a minimum date of 11,000 years BP, but note that it possibly occurred several millennia later (Averill et al. 1980).

The radiocarbon age of 840  $\pm$  30 BP for the inception of meadow mat formation (and, presumably, surface inundation) at the SCCC project site is roughly 1200-1800 years later than that reported by Carmichaels and Heusser. In the areas sampled by those researchers the peat



deposit directly overlies lake clays. At the Bellmans Creek location reported by Schuldenrein (1995), a date of 930 $\pm$ 50 BP was obtained from approximately the midpoint of a 2 meter (6.6 feet) peat column overlying 1 meter of alluvial sand. Taken together, this assemblage of dates strongly suggest that the well-drained sandy alluvium of the SCCC project site made up a landform that constituted a local topographic high and did not undergo inundation by rising sea level until at least a millennium after much of the surrounding landscape had transitioned to an estuarine setting. This late date of inundation, along with well-drained soils, proximity to resources of the Hackensack River and surrounding estuarine marshes, and proximity to lithic resources of Snake Hill, would appear to make this area a highly desirable Late Holocene habitation area.



### 3.0 CONCLUSIONS AND RECOMMENDATIONS

Archaeological monitoring was conducted during the excavation and construction of a slurry wall around the perimeter of the SCCC Site (consisting of the former White Tar company property and the former Edison Battery Plant property among others), the Diamond site and a portion of the (Koppers) Seaboard Site, located on the Kearny Peninsula in the Town of Kearny, New Jersey. The monitoring was conducted to determine if prehistoric materials or features were present in deep alluvial soils of approximately 9 to 17 feet below surface at the site. A previous study of the geomorphology of the site (Stiteler 2010), conducted through interpretation of geotechnical boring logs, identified a stratum of sandy alluvium 3 to 8 feet thick beneath fill and thick marsh mat. The presence of the broad area of sandy sediment, which appears to be somewhat anomalous in the Meadowlands setting, suggests that as this part of the Hackensack River valley was affected by Late Holocene sea level rise and marsh formation, the area between the Passaic and Hackensack River channels formed a local topographic high where inundation would have been delayed. If this is the case, this area of sandy, well-drained soils near the confluence of two major local drainages and providing access to estuarine resources would have been an attractive habitation setting.

A total of 14 samples and 7 interim samples were taken along the alignment of the proposed slurry wall. Evidence of possible prehistoric use of the area was recovered in eight of the samples – a total of 146 possible pieces of lithic debitage and a possible depleted core were recovered during the sampling. The majority of the flakes recovered were found along the eastern alignment of the slurry wall across the Hackensack River from Snake Hill, a diabase intrusion which is the likely source of much of the lithic material. Artifacts were also recovered along the western alignment of the slurry wall. Samples from the northern and southern portions of the slurry wall did not produce any prehistoric artifacts. An archaeological site form will be filed with the New Jersey State Museum (Appendix D).

Since no additional excavation is currently scheduled for the site only general recommendations can be made from the archaeological monitoring. First, we would recommend conducting archaeological monitoring on any proposed slurry wall site, where a medium to high potential for archaeological materials exists. Second, for the current project site, we would recommend consideration of additional archaeological monitoring for any future deep excavations that are proposed within close proximity to the marsh mat/sand layer interface (roughly 12 to 15 feet more below surface) within the Diamond Shamrock or Standard Chlorine sites, especially if the deep excavation is along the Hackensack River.



#### 4.0 BIBLIOGRAPHY

Audin, Michael

2009 *Phase IA Cultural Resource Survey, For The Standard Chlorine Chemical Company Site, Interim Response Action Workplan, Town Of Kearny, Hudson County, New Jersey.* Prepared for the Peninsula Restoration Group by Langan Engineering and Environmental Services, Inc. Elmwood Park, NJ. Report on file at the State Historic Preservation Office, Trenton, New Jersey.

2010 *Summary Phase IB Cultural Resource Report, For The Standard Chlorine Chemical Company Site, Interim Response Action Workplan, Town Of Kearny, Hudson County, New Jersey.* Prepared for the Peninsula Restoration Group by Langan Engineering and Environmental Services, Inc. Elmwood Park, NJ. Report on file at the State Historic Preservation Office, Trenton, New Jersey.

Burrows, Ian and Damon Tvaryanas

2009 *Historic Context Development, Hackensack Meadowlands, Drainage System and Features, Hackensack Ecosystem Restoration Project, Hudson and Bergen Counties, New Jersey.* Prepared for Mabbett & Associates, Inc. and the U.S. Army Corps of Engineers. Features

NJDEP

2009 Aerial Photograph

Stiteler, John

2010 *Geomorphological Assessment For The Standard Chlorine Chemical Company Site, Interim Response Action Workplan, Town Of Kearny, Hudson County, New Jersey.* For the Peninsula Restoration Group by Langan Engineering and Environmental Services, Inc. Elmwood Park, NJ. Report on file at the State Historic Preservation Office, Trenton, New Jersey.

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**APPENDIX A**

**QUALIFICATIONS OF PREPARERS**



**MICHAEL AUDIN, RPA**  
**Archaeologist / Cultural Resource Specialist**

**Field Crew Management**  
**Phase I, II and III Excavation**  
**Human Remains/Burial Excavation**  
**Site Preparation and Survey**  
**Historic Research**  
**Photographer**  
**Laboratory Analysis**  
**Field Illustration**  
**Report Writing and Editing**  
**Historic American Building Surveys**

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**EDUCATION**

Hunter College: M.A. Anthropology  
William Paterson University: B.A. Anthropology  
Archaeological Field School: Lenape Meadows, Somerset  
County Parks Commission, New Jersey

**YEARS EXPERIENCE: 9**

**SUMMARY QUALIFICATIONS**

Mr. Audin is a Registered Professional Archaeologist (RPA) that has been reviewed by several State Historic Preservation Offices as a Principal Investigator and has over 9 years of professional experience (over 7 years in management positions) in Cultural Resource Management. Responsibilities include coordination and implementation of archaeological and historical tasks associated with projects requiring cultural and historic assessments as part of permit and regulatory review. Office tasks include communication with State Historic Preservation Offices and other regulatory offices, budgeting, proposal writing, field testing strategy and planning, hiring of field technicians, report writing, GIS mapping, production and editing. Field tasks include all aspects of Phase I, II and III archaeological and historical investigations including field supervision, excavation, monitoring, site photographer, prehistoric and historic site assessments, site survey, field illustration, field documentation, planning, preliminary architectural evaluations and level III Historic American Building Surveys.

In addition Mr. Audin has 3 years of experience as a land surveyor and 10 years business management experience prior to coming to cultural resources.

**RELEVANT EXPERIENCE**

**Tomjack Creek, Phase IA, Smithfield Township, Pennsylvania**

Principal Investigator for prehistoric/historic site investigation for a US Army Corps of Engineers Permit for a wetland mitigation site as part of the Tennessee Gas Line Company Northeast Upgrade Project. Conducted research, site reconnaissance, writing and preparation of report, edited and produced report for submission.

**Van Auken Creek, Phase IA, Clinton Township, Pennsylvania**

Principal Investigator for prehistoric/historic site investigation for a US Army Corps of Engineers Permit for a wetland mitigation site as part of the Tennessee Gas Line Company Northeast Supply Diversification Project. Conducted research, site reconnaissance, writing and preparation of report, edited and produced report for submission.

**Renaissance Plaza Project, Phase I, Egg Harbor City, New Jersey**

Principal Investigator for prehistoric/historic site investigation for NJ Pinelands Commission. Conducted research, conducted subsurface field testing for historic features, writing and preparation of report, edited and produced report for submission.



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#### **Alpha Water Works Upgrades Project, Phase II, Site 28Wa673, Alpha, New Jersey**

Principal Investigator for prehistoric/historic site investigation for NJDEP Environmental Infrastructure Trust funding program. Conducted research, excavation of shovel test pits and units, laboratory analysis of artifacts, writing, preparation, editing and producing report for submission.

#### **State University of New York, Ulster Campus, Phase I, Marbletown, New York**

Principal Investigator for prehistoric/historic site investigation for NYS SEQR reviewed project. Conducted research, assessed prehistoric/historic archaeological potential, field testing, writing and preparation of report, edited and produced report for submission.

#### **NJ Transit, Phase III Data recovery Investigation, Market St Garage, Site 28Pa, Paterson, NJ**

Principal Investigator for unanticipated historic structure uncovered during excavation for a drainage pipe. Field work consisted of the excavation and documentation of a historic industrial feature partially exposed during excavation work. Recommended preservation in place with appropriate fill materials and submitted a technical memo to NJDEP SHPO.

#### **EZ Automotive Services, Phase IA & IB, Robbinsville, New Jersey**

Principal Investigator for prehistoric/historic site investigation for NJDEP. Conducted research, assessed prehistoric/historic archaeological potential, conducted field testing, writing and preparation of reports, edited and produced report for submission.

#### **Old St. Patrick's Cathedral Wall Restoration Project, Archaeological Monitoring, New York**

Principal Investigator for and archeological monitor for Landmarks Preservation Commission permit for brick wall stabilization around a historic cemetery in New York City. Conducted limited research, monitoring for human remains during backhoe excavation for new concrete supports, supervision of one archaeological assistant, determined method of avoidance or removal of human remains encountered and eventual reburial, report writing and preparation.

#### **Pennsauken Country Club Water Reuse Project, Phase I, Pennsauken, New Jersey**

Principal Investigator for prehistoric/historic site investigation for NJDEP Environmental Infrastructure Trust funding program. Conducted research, preparation of site, excavation of shovel test pits, laboratory analysis of artifacts, writing, preparation, editing and producing report for submission.

#### **NYS Route 440 Pole Relocation Project, Phase IA & IB, Staten Island, New York**

Principal Investigator for prehistoric/historic site investigation for Department of Transportation NEPA documentation and Section 106 reviewed project. Conducted research, assessed prehistoric/historic archaeological potential, conducted field testing, writing and preparation of reports, edited and produced report for submission.

#### **World Trade Center, Phase III, Potential Human Remains Recovery, Staten Island, New York**

Field crew for recovery of potential human remains for the New York City Office of the Chief Medical Examiner. Conducted materials screening for human remains and artifacts relating to the 2001 attacks on the World Trade Center.

#### **SCCC, Phase IB Cultural Resource Investigation, Kearny, New Jersey**

Principal Investigator for historic investigations for NJDEP and USEPA Superfund site. Conducted additional research proving the Jersey City Water Works was located outside of the project area



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and conducted backhoe trenching for historic drainage features related to the Hackensack Meadowlands, writing and preparation of report, edited and produced report for submission.

#### **Access to Regional Core (ARC), 3-D Laser Scanning, New York, New York**

Field crew for documentation of historic and non-historic buildings for Section 106. Conducted 3-D laser scanning of all buildings in the project area. Collected field data of varying resolutions for buildings in project area, historic buildings were recorded at higher resolution.

#### **Jersey City Walkway and DMAVA Park, Phase IA, Jersey City, New Jersey**

Principal Investigator for prehistoric/historic site investigation for NJDEP and Section 106. Conducted research, assessed prehistoric/historic archaeological potential, monitored geotechnical sub surface investigation for archaeological remains, writing and preparation of report, edited and produced report for submission.

#### **Route 33 Interchange Improvements, Phase I, Palmer Township, Pennsylvania**

Principal Investigator for prehistoric/historic site investigation for Pennsylvania Department of Transportation and Section 106 reviewed project. Conducted research, site excavation of shovel test pits, laboratory analysis of artifacts, writing and preparation of report, and editing report for submission.

#### **USDA, Health-Based Plant Genomics Facility, Phase IB, Cornell University, Ithaca, New York**

Co-Principal Investigator for prehistoric/historic site investigation as part of a Section 106 Assessment for the addition to the Plant Genomics Laboratory Building site. Conducted research, excavation of shovel test pits, laboratory analysis of artifacts, writing and preparation of report, edited and produced report for submission.

#### **SCCC, Phase IA Cultural Resource Investigation, Kearny, New Jersey**

Principal Investigator for prehistoric/historic site investigation for NJDEP and USEPA Superfund site. Conducted research, assessed prehistoric/historic archaeological potential, writing and preparation of report, edited and produced report for submission.

#### **GAC Adsorption Plant, Phase I, Pennsauken, New Jersey**

Principal Investigator for prehistoric/historic site investigation for NJDEP Environmental Infrastructure Trust funding program. Conducted research, preparation of site, excavation of shovel test pits, laboratory analysis of artifacts, writing and preparation of report, edited and produced report for submission.

#### **Penn Regional Business Center III, Phase I, Smithfield, Pennsylvania**

Principal Investigator for prehistoric/historic site investigation for Pennsylvania Funding Grant Application. Conducted research, preparation of site, excavation of shovel test pits, laboratory analysis of artifacts, writing and preparation of report, edited and produced report for submission.

#### **Montauk Theater, Level III HABS and Architectural Salvage Plan, Passaic, New Jersey**

Principal Investigator for EO215 compliance for NJ Schools Development Authority. Conducted level III Historic American Building Survey (HABS) including photographic documentation and an architectural Salvage Plan of the Montauk Theater to mitigate the proposed demolition of this building. The HABS and Salvage Plan were requested by the NJ HPO to satisfy the EO215 review.



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#### **Former Koppers Superfund Site, Additional Phase IB, Newport, Delaware**

Crew chief and OSHA Site Safety Officer for prehistoric/historic site investigation for EPA compliance for superfund site during three month phase IB auger testing conducted by 13 archaeologists. Teamed with John Milner and Associates. Work included over 1,700 phase IB augers in a tidal marsh. Additional work included field tech training, and safety oversight.

#### **Dredge Stockpile Site, Phase I, Harmony, New Jersey**

Field director, research coordinator, lab director and photographer for prehistoric/historic site investigation for Section 106 review of stockpile site for dredge materials from FEMA. Field duties include preparation of site, excavation of 32 shovel test pits and site survey. Post field work included laboratory analysis of artifacts, writing of sections of report and prepared, edited and produced report for submission.

#### **Lowes, Phase I, Mansfield, Pennsylvania**

Field director, research coordinator, lab director and photographer for prehistoric site investigation for review for big box retail store. Field duties include site preparation, excavation 60 shovel test pits of site and survey. Post field work included laboratory analysis of artifacts, writing of sections of report and prepared, edited and produced report for submission.

#### **Former Jacobs Aircraft Engine Factory, HABS, Lower Pottsgrove, Pennsylvania**

Complier/photographer for NPDES permit compliance. Conducted low level Historic American Building Survey (HABS) including photographic documenting of the former Jacobs Aircraft Engine Factory and Administrative Building to mitigate the proposed demolition of these buildings. The photographic documentation was requested by PHMC to satisfy the NPDES permit review.

#### **Queensboro Plaza, Phase I, Long Island City, New York**

Field director, research coordinator, lab director and photographer for historic site investigation for cultural resources section 106 for a NEPA assessment and LPC review for bike path in the Queensboro Plaza. Includes an archaeological assessment, field testing and architectural evaluation of the current property. Field work included site preparation, the excavation of a two meter by two meter test pit and site survey. Post field work included laboratory analysis of artifacts, writing of sections of report and prepared, edited and produced report for submission.

#### **Lowes, Phase IB, Montgomery, New York**

Field director, research coordinator, lab director and photographer for prehistoric/historic site investigation for SEQRA review for retail store. Field work included the preparation of site, excavation of 60 shovel test pits and site survey. Post field work included laboratory analysis of artifacts, writing of sections of report, prepared, edited and produced report for submission.

#### **Green Brook Trail, Application for Project Authorization/Preliminary Assessment, Plainfield, Green Brook, and North Plainfield, New Jersey**

Principal Investigator for New Jersey Historic Preservation Act and Freshwater Wetland Permit compliance. Completed and submitted an Application for Project Authorization for Green Brook Park and Washington Park Historic District for a multi-use recreational trail. Additionally, completed a preliminary archaeological assessment for the proposed seven-mile trail, including research, analysis, and report writing.



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#### **Public School #3, Archaeological Monitoring, West New York, New Jersey**

Archaeological Monitor/researcher for NJ Executive Order 215 Compliance for 1 day of archaeological monitoring for human remains and research on school site that found headstone during excavation. Post field activities included report writing for submission to state.

#### **Former Koppers Superfund Site, Phase IB and II, Newport, Delaware**

Crew chief and OSHA Site Safety Officer for EPA compliance for superfund site during six month phase IB and II field excavations conducted by 20 archaeologists, teamed with John Milner and Associates. Work included setting of testing grid and field testing of over 3000 phase IB auguring and STP units and over 180 phase II units. Additional work included lab work, field tech training, and safety oversight.

#### **Bronx River Park, Phase IA, Bronx, New York**

Research coordinator, researcher and report production for New York City Landmarks Preservation Commission Compliance. Assessed park land for prehistoric and historic archaeological potential.

#### **USDA, Health-Based Plant Genomics Facility, Cornell University, Ithaca, NY.**

Research coordinator, researcher and report production for archaeological resources Section 106 Assessment as part of a NEPA Screening on the Plant Genomics Laboratory Building site.

#### **Weeksville Village, Phase IB testing, Brooklyn, New York**

Archaeological Monitor for SEQRA review for village cultural center. Performed 1 day of field duties, with Joan Geismar. Work included monitoring of back hoe trenching for foundations and artifact deposits associated with the Huntely Houses.

#### **Edgewater Colony, Phase II, Edgewater, New Jersey**

Field director and lab director for or EIT storm water improvements loan consisting of the preparation of a Phase II prehistoric/historic site investigation. Included the direction of two field technicians excavating a total of 8 standard test units, photographer and the coordination of lab work. Other post-field responsibilities include writing sections, preparation and production of the final report for submittal to New Jersey DEP Municipal Finance and Technical Services.

#### **Portion of the Northeast Business Park, Phase IA, Washington Township, New Jersey**

Research coordinator, researcher, and report production for New Jersey Wetlands Permit. Assessed site for prehistoric and historic archaeological sensitivity.

#### **Creighton Farm Bridge Crossing, Phase I, Willistown, Pennsylvania**

Field director, research coordinator, lab director, photographer and report preparation for Army Corps of Engineers Permit. Post field work included laboratory analysis of artifacts, assisting with the writing, prepared, edited and produced report.

#### **Camp Laughing Water, Phase I, New Hanover and Upper Fredrick, Pennsylvania**

Field director, research coordinator, lab director, photographer and report preparation for Army Corps of Engineers Permit. Post field work included laboratory analysis of artifacts, assisting with the writing, prepared, edited and produced report.



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#### **Camp Hidden Falls, Phase I, Delaware and Lehman Townships, Pennsylvania**

Field director, research coordinator, lab director, photographer and report preparation for Army Corps of Engineers Permit. Post field work included laboratory analysis of artifacts, assisting with the writing, prepared, edited and produced report.

#### **Select Sires, Phase I, Eaton, Pennsylvania**

Field director, research coordinator, lab director, photographer and report preparation for Pennsylvania section 105 Permit. Post field work included laboratory analysis of artifacts, assisting with the writing, prepared, edited and produced report.

#### **Tournament World, Phase IB, Montgomery, New York**

Field director, research coordinator, lab director, and photographer for SEQRA review. Field assessment for prehistoric and historic archaeological sites. Post-field work included laboratory analysis of artifacts, assisting with the writing, prepared, edited and produced report.

#### **Former Old First Presbyterian Church Cemetery, Phase III Data Recovery, Newark, New Jersey**

Project Manager/Field Director

Responsibilities included:

- Over sight of all field activities for 2.2 acre cemetery excavation
- Preparation and implementation of a comprehensive field plan for the locating human remains and associated artifacts
- Hiring and managing a field staff of 35
- Directing and coordinating sub contractor with field staff of 30
- Directing and coordinating 4 backhoes on site to move overburden and back fill site
- Over sight of cataloging all burials and artifacts
- Laboratory analysis of artifacts
- Writing, coordinating and editing of final report

#### **Circulations Improvement Project, Phase IA and IB, Newark, New Jersey**

Field director, research coordinator, photographer and lab director for NJ Executive Order 215 Compliance. Phase I background investigation and Phase IB field testing. Work included coordinating conducting research, conducting photographic pedestrian survey site, and conducting field testing. Post field work included laboratory analysis of artifacts and preparation of the final reports. Report preparation included writing sections of the report, preparation and production of final report for submittal.

#### **Edgewater Colony, Phase IB, Edgewater, New Jersey**

Field director, research coordinator, and photographer for Environmental Infrastructure Trust Financing Program (EIT). Preparation of a Phase IB prehistoric/historic site investigation. Included the direction of three field technicians digging a total of 139 standard test pits, project coordination with the principal investigator, photographer and the coordination of lab work. Other post-field responsibilities include assisting with the writing, preparation and production of the final report.

#### **Former Central Railroad Terminal, Archaeological Monitoring, Newark, New Jersey**

Crew Chief/Project Coordinator Application for project authorization compliance of 6 week archaeological monitoring during demolition of former railroad terminal for SHPO resolution on application for project authorization. Monitor for human remains associated with the Old First



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Presbyterian Church cemetery, identifying, excavating, cataloging and turn over to mortician for reburial. Post field work included lab analysis of artifacts.

**Regional Biocontainment Laboratory – Newark Center, University of Medicine and Dentistry of New Jersey, Newark, New Jersey** – Researcher and report writer for cultural resources section of Environmental Assessment in accordance with the requirements of NEPA for the construction of a new Regional Biocontainment Laboratory under a grant from the National Institutes of Health.

**USDA, Health-Based Plant Genomics Facility, Phase IA, Cornell University, Ithaca, New York** Researcher and site inspector for cultural resources section of a Section 106 Assessment as part of a NEPA Screening on the Plant Genomics Laboratory Building site. Includes an archaeological assessment and architectural evaluation of the current facility and property.

### **Newark Downtown Core Redevelopment and Circulations Improvement Plan, Newark, New Jersey**

Responsibilities included:

- Preparing a multi-phased strategy for investigating, testing and mitigating the project area
- Conducting preliminary research regarding various aspects of the project area, including possible intact remains within the former First Presbyterian Church cemetery
- Supervising research
- Conducting field photo reconnaissance and preliminary visual assessment of all properties potentially eligible for listing on the State and National Register of Historic Places that may be impacted by the proposed project
- Contributing to the Application for Project Authorization regarding the proposed demolition of five historic structures located within the Four Corners Historic District

### **NJSCC School Development Program, New Jersey**

Crew Chief, researcher, photographer and report writing and production for NJ Executive Order 215 Compliance and NJSCC Guidelines. Participated in the development and redevelopment of 20 new and existing school sites located throughout New Jersey. Responsibilities included:

- Conducting and overseeing background research at the New Jersey Historic Preservation Office, the New Jersey State Museum and local archives
- Conducting field photo reconnaissance and preliminary visual assessment of all properties potentially eligible for listing on the State and National Register of Historic Places that may be impacted by the proposed project
- Preparation and assistance in writing of the Cultural and Historical Resource Assessment section of Environmental Assessment and Environmental Impact Statement Reports and Phase IA background investigations
- Overseeing report production and preparing maps and figures
- Producing for internal departments/clients memos, letters and other documentation outlining potential issues and possible recommendations.

### **Pen Del Development, Phase IB and II, Site 28BU590, Pemberton, New Jersey**

Field/Laboratory Technician of a Phase I & II prehistoric site investigation/excavation. Field responsibilities also included photographer and mapping excavation locations using GPS equipment. Laboratory Technician responsibilities included; cleaning, cataloging and photographing all artifacts. Other post-field responsibilities included assisting with the preparation and production of the final cultural resource report for submittal to New Jersey HPO.



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#### **Field School, Lenape Meadows, Phase II, Basking Ridge, New Jersey**

Field and Laboratory Technician for phase II prehistoric excavation. Field work included daily preparation of site, field excavations, documentation of artifact finds, field crew management and the closing up the site for the winter. Laboratory work included cleaning, identifying, cataloging and photographic documentation of all artifacts.

#### **Lithics Identification Project, William Paterson University, New Jersey**

Volunteer. Conducted laboratory analysis, identification and cataloging, of over 5,000 stone fragments from the Wallkill River basin in Northern New Jersey, submitted to Dr. Janet Pollak. Research included identifying and cataloging human produced stone flakes and tools vs. naturally altered stone.

#### **SELECTED PUBLICATIONS**

*Phase IA Cultural Resource Survey, Standard Chlorine Chemical Company Site, Interim Response Action Workplan, Town of Kearny, Hudson County, New Jersey.* Michael Audin, RPA, Principal Investigator, 2009. MS on file at NJSHPO, Trenton, NJ.

*Phase I Cultural Resource Investigation GAC Adsorption Plant, Pennsauken, Camden County, New Jersey.* Michael Audin, RPA, Principal Investigator, 2009. MS on file at NJSHPO, Trenton, NJ.  
*Historic American Building Survey for the Montauk Theater, Passaic, Passaic County, New Jersey.* Michael Audin, RPA, Principal Investigator, 2009. Submitted to the NJ HPO, Trenton, NJ.

*Phase I Archaeological Investigation Montgomery Towne Square, Montgomery, Orange County, New York.* Ludomir Lozny Principal Investigator, Michael Audin, and Sarah Hlubik, 2007. MS on file at OPRHP, Pebbles Island, NY.

*Phase II Archaeological Investigation of the Edgewater Colony, Edgewater, Bergen County, New Jersey.* Ludomir Lozny PI, Michael Audin, and Sarah Hlubik, 2007. MS on file at NJSHPO, Trenton, NJ.

*Phase I Archaeological Survey Camp Hidden Falls, Lehman Township, Pike County, Pennsylvania.* Ludomir Lozny PI, Michael Audin, and Erol Kavountzis, 2006. Ms on file at PHMC, Harrisburg, Pa.

*Phase I Archaeological Investigation Eaton, Wyoming County, Pennsylvania.* Ludomir Lozny PI, Michael Audin, and Erol Kavountzis, 2006. Ms on file at PHMC, Harrisburg, Pa.

*Phase III Cemetery Excavation, Old First Presbyterian Church, Newark Downtown Core Redevelopment, Newark, Essex County, New Jersey.* Michael Audin, Erol Kavountzis, and Sarah Hlubik, 2005. Manuscript on file at NJSHPO, Trenton NJ.

#### **PRESENTATIONS**

2011 "New Jersey's Iron Coffins" presented at the Archaeological Society of New Jersey Meeting.

2009 "The Montauk Theater: Last of the Seven Passaic Theaters" presented to a William Paterson University Class on Material Culture.

2007 "Excavations at the Old First Presbyterian Cemetery in Newark, NJ" presented to William Paterson University's Anthropology Club.



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#### **SUMMARY OF PROFESSIONAL ACTIVITIES**

Mr. Audin is the author or co-author of over sixty (60) cultural resource reports in New Jersey, New York and Pennsylvania.

#### **PROFESSIONAL DEVELOPMENT**

Historic Preservation Research Course, Drew University, February 2005  
OSHA 40 Hour Certified HAZWOPER Training (December, 2005) and refreshers  
OSHA Site Supervisor Certified (June, 2007) and refreshers  
NJSHPO Cultural Resources Best Practices Workshop, October 2006  
Introduction to ArcGIS I, November 2006  
Preservation Planning in the Highlands, Drew University, March 2007  
Section 106 Essentials Class with ACHP, July 2007  
Pennsylvania Department of Transportation, Cultural Resource Handbook Class, April 2010  
Federal Communication Commission Training, Washington D.C., June 2011

#### **PROFESSIONAL AFFILIATIONS**

Archaeological Society of New Jersey  
Council for Northeast Historical Archaeology  
Eastern States Archaeological Federation  
Lambda Alpha National Collegiate Honors Society for Anthropology  
Middle Atlantic Archaeological Conference  
National Trust for Historic Preservation  
New York State Archaeological Association (Lifetime Member)  
Register of Professional Archaeologists  
Society of American Archaeology  
Society for Historical Archaeology  
Society for Industrial Archaeology  
The Society for Pennsylvania Archaeology



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**Title:**

Soil scientist/geomorphologist  
Archaeologist

**Education:**

B.A., Anthropology, The Pennsylvania State University, University Park, PA., 1985  
M.S., Soil Science, The Pennsylvania State University, University Park, PA., 1997

**Responsibilities:**

**Archaeologist** responsible for conducting Phase I, II, and III archaeological investigations including fieldwork, background research, artifact analysis, site interpretation, and report preparation.

**Soil scientist/geomorphologist** responsible for analysis of soils and landforms of archaeological sites. Foci include assessment of landform and land surface stability; interpretation of depositional and erosional environments; determination of age of soils; assistance in interpretation of paleoenvironmental conditions.

**Experience:**

1997-Present

**Archaeologist and Soil scientist/geomorphologist, Gannett Fleming, Inc, Camp Hill Pa.** – Conduct Phase I, II and III archaeological investigations and analyze and interpret soils and settings of archaeological sites.

**Free lance consultant** – Conduct studies of soils and geomorphology prior to and during archaeological investigations to guide methodology and aid in site interpretation. Act as field director or crew member on archaeological projects as requested.

1992-1997

**Graduate Assistant, Land Analysis Lab, The Pennsylvania State University, University Park** Conducted research on M.S. thesis "Comparison of Hydrology and Nutrient Balances in Two Small Watersheds in Northeastern Pennsylvania" and other projects. Collected water samples, maintained stream gaging and sampling stations, mapped and characterized soils, analyzed samples and data, and assisted in report preparation.

1996

**Biological Aide (soils), U.S. Department of Agriculture, Natural Resources Conservation Service (NRCS)** Assisted in verifying accuracy and quality of soil mapping boundaries; collected soil data in field; assisted in on-site evaluations and interpretation for NRCS projects; and assisted in collecting crop yield estimates and woodland site indices.

1985-1992

**Field Director, Archaeological & Historical Consultants, Inc., Centre Hall, PA.** Responsible for conducting Phase I, II, and III archaeological investigations. Directed operations in the field;



mapped sites using transit; analyzed artifacts; wrote reports on excavations; and conducted background research and informant interviews.

### **Selected Projects, 1997-present:**

**US Route 1 Improvements, Frederica, Kent County, Delaware (2009).** Soil scientist/geomorphologist responsible for description and interpretation of geomorphology, sediments, and stratigraphy for Phase II and III archaeological investigations at location of proposed intersection improvement project, conducted by Archaeological and Historical Consultants, Inc. for DelDOT and Federal Highway Administration. Fieldwork and analysis ongoing and report in preparation.

**Aughwick Creek Watershed (Watershed 12C) Study, Huntingdon and Juniata Counties, Pennsylvania (2008-2009).** Soil scientist/geomorphologist responsible for conducting fieldwork and analysis in collaboration with Heberling Associates, Inc.; Dr. Frank Vento, Professor of Geology, Clarion University; and paleobotanist Lucinda McWeeney. Study focus was reconstruction of Quaternary geomorphology and environment in Aughwick Creek drainage in south-central Pennsylvania, particularly formation and relationships of alluvial landforms. Methodology included backhoe trenching, soil augering, sample collection, and analysis of LIDAR and USGS stream-flow data. Study sponsored as alternative mitigation under agreement between PennDOT and Pennsylvania Historical and Museum Commission. Draft report submitted to PennDOT

**Benson Site Phase III Investigation, Bainbridge, Chenango County, New York (2008-2009).** Soil scientist/geomorphologist responsible for description and interpretation of geomorphology, sediments, and stratigraphy at Phase III archaeological investigation on North Branch Susquehanna River, conducted by the Public Archaeology Facility, SUNY Binghamton for NYDOT. Report in preparation pending completion of archaeological fieldwork.

**I-80 Weigh Station Improvements, Delaware Water Gap, New Jersey (2004-2009).** Soil scientist/geomorphologist for Phase II and III archaeological investigation at proposed truck weigh station expansion project on alluvial terrace of Delaware River. Reports prepared and submitted to Hunter Research Inc., Trenton, New Jersey.

**I-80 Section 078 Bridge Improvements Project, Columbia County, Pennsylvania (2007-2008).** Field Director and soil scientist/geomorphologist for Phase I archaeological survey of proposed improvements to I-80 bridge over North Branch Susquehanna River. Phase I report submitted to PennDOT and Pennsylvania Historical and Museum Commission, Harrisburg, Pa.

**Strattan Mill Creek Project, Kirkwood Center, Broome County, New York (2007-2009).** Soil scientist/geomorphologist responsible for description and interpretation of geomorphology, sediments, and stratigraphy at Phase III archaeological investigation on North Branch Susquehanna River, conducted by the Public Archaeology Facility, SUNY Binghamton for NYDOT. Report in preparation pending completion of archaeological fieldwork.

**Granger Pipeline Project, Caernarvon and East Earl Townships, Lancaster County, Pennsylvania (2007).** Field Director and soil scientist/geomorphologist for Phase I and Phase II archaeological survey of proposed 12 mile gas pipeline corridor. Report submitted to Pennsylvania Historical and Museum Commission, Harrisburg, Pa.



**Timber Banks Marina Development Project**, Town of Lysander, New York (2007). Soil scientist/geomorphologist responsible for description and interpretation of geomorphology, sediments, and stratigraphy in study conducted as adjunct to Phase I archaeological investigation conducted at golf and residential development on Seneca River. Report submitted to Pooler Development LLC.

**PaDEP Watershed 10-D Study**, Lycoming, Montour, Northumberland, and Sullivan Counties, Pennsylvania (2006-2007). Soil scientist/geomorphologist responsible for conducting literature review and fieldwork and preparing report on late Pleistocene through Holocene geomorphic history of Muncy Creek and Chillisquaque Creek watersheds. Project conducted as adjunct to PP&L water pipeline project. Research focused on comparison of soil and landform formation in glaciated and unglaciated portions of watershed. Report prepared and submitted to Kittatinny Archaeological Research, Inc., Stroudsburg, Pa

**Walters Business Park Expansion Project**, Sproul, Blair County Pennsylvania (2006). Soil scientist/geomorphologist for Phase II and III archaeological investigations of Paleo-Indian – Early Archaic site within proposed access road relocation APE. Research focused on site formation processes and paleoenvironmental reconstruction. Report in preparation for submission to Archaeological and Historical Consultants, Inc, Centre Hall, Pa.

**Logan Equine Park**, Logan Township, Gloucester County, New Jersey (2006). Soil scientist/geomorphologist responsible for description and interpretation of pre-fill geomorphology and sediments at proposed construction site on lower Delaware River previously used as hydraulic dredge spoil deposit area. Methodology entailed description of profiles of 17 backhoe trenches ranging in depth from 8-23'. Report prepared and submitted to Cultural Resources Consulting Group, Highland Park, New Jersey.

**Holtwood PP&L Hydroelectric Plant Expansion Project**, Holtwood, Lancaster County, Pennsylvania (2006). Soil scientist/geomorphologist responsible for conducting fieldwork, interpreting soil auger core data and preparing report for study of structure and depositional history of Piney Island and environs in lower Susquehanna River. Report submitted to Hunter Research Incorporated, Kleinschmidt Engineers and Pennsylvania Power and Light Corp.

**Hampden Township Wastewater Treatment Plant Expansion Project**, Cumberland County, Pennsylvania (2006). Field Director and soil scientist/geomorphologist for Phase I and II archaeological investigations conducted by Gannett Fleming, Inc. for proposed wastewater treatment plant expansion project area in Cumberland County. Report prepared and submitted to Hampden Township Supervisors and Pennsylvania Historical and Museum Commission, Harrisburg, PA.

**Kingston Armory Expansion Project**, Kingston, Ulster County, New York (2005-2006). Soil scientist/geomorphologist responsible for description and interpretation of geomorphology, sediments, stratigraphy and disturbance prior to and during Phase II and III archaeological investigations at US Army Reserve facility. Report prepared and submitted to Louis Berger Associates, Albany, New York.

**Connoquenessing Watershed Study**, Butler, Beaver and Lawrence Counties, Pennsylvania (2005). Soil scientist/geomorphologist responsible for conducting fieldwork, interpreting soil auger core data and preparing report for study of alluvial landforms in Connoquenessing Creek watershed as adjunct to PennDOT Main Street and Wayne Street bridge replacement projects,



Butler, Pa. Report prepared and submitted to Archaeological & Historical Consultants, Inc., Centre Hall, PA. and PennDOT District 10.

**Garden State Parkway Improvement Project**, Ocean, Burlington and Atlantic Counties, NJ (2003). Field Director and soil scientist/geomorphologist for Phase I archaeological investigation along fifty miles of proposed highway improvement project area. Report prepared and submitted to the New Jersey Department of Transportation.

**Appomattox River Water Authority Cemetery Site**, Chesterfield County, VA (2002-2003). Field Director and soil scientist/geomorphologist for Phase I, II and III archaeological investigations and exhumations of ninety-six 19<sup>th</sup> century burials at water treatment facility expansion project. Report prepared and submitted to the Appomattox River Water Authority, Petersburg, VA..

**Wayne Street and Main Street Bridge Replacement Projects**, Butler, Pennsylvania. (1999-2001). Soil scientist/geomorphologist responsible for on-site monitoring of split-spoon sampling of soils and sediments along proposed construction corridor over Connoquenessing Creek. Monitored excavation by truck-mounted rig of 25 soil cores from surface to bedrock, described and interpreted soils and sediments revealed in core samples. Used information gained from cores, along with background research and observations of local geomorphology, to reconstruct Late Pleistocene and Holocene development of uplands and floodplain adjacent to Connoquenessing Creek, determine degree of site disturbance within historic era, and assess potential for intact archaeological resources in project areas. Soil scientist for Phase I archaeological investigation – supervised excavation of backhoe trenches; described and interpreted soils and sediments revealed in trenches and archaeological excavation units. Report prepared and submitted to Archaeological & Historical Consultants, Inc., Centre Hall, PA.

**U.S. Route 15 Improvements**, Tioga County, Pennsylvania (1998-2000). Soil scientist/geomorphologist responsible for interpretation of deposition dynamics, site stability, and degree of a disturbance at Phase I, II and III archaeological investigations. Examined soil profiles in backhoe trenches and archaeological excavation units on the Tioga River floodplain to reconstruct post-glacial history and prehistoric occupation of Tioga River Valley in the project area. Reports submitted to Louis Berger Associates, East Orange, New Jersey and to the Pennsylvania Historical & Museum Commission, Harrisburg, PA.

**Vineland Chemical Company Superfund Remediation Project**, Vineland, NJ, (1998). Soil scientist/geomorphologist responsible for monitoring split-spoon sampling of floodplain sediments from the Blackwater Branch of Maurice River and examining shovel test profiles on adjacent uplands at a U.S. EPA Superfund site. All fieldwork conducted in U.S. EPA Level C PPE. Focus of study was to reconstruct geomorphic history and determine the potential for intact archaeological resources at this arsenic-contaminated site slated for remediation. Report prepared and submitted Hunter Research, Inc., Trenton, NJ. for inclusion in archaeological site report submitted to U.S. Army Corps of Engineers [USACOE], Philadelphia District, and U.S. Environmental Protection Agency [USEPA], Region II.

**Ohio River Islands Refuge Project**, PA, OH, WV, and KY (1997). Soil scientist/geomorphologist responsible for conducting reconnaissance survey of nine islands over a 400-mile stretch of the Ohio River. Examined and described soils using shovel tests, auger probes, and exposures in erosion faces in order to assess age, rates of sediment accretion, and stability of islands; assessed potential for presence of historic and prehistoric archaeological sites on islands. Prepared and submitted report to USF&WS as part of a larger report submitted by



Archaeological & Historical Consultants, Inc. Served as Field Director and Soil Scientist at follow-up Phase I archaeological survey on Manchester Island #2, near Maysville, Kentucky. Prepared and submitted report to USF&WS as part of report submitted by Archaeological & Historical Consultants, Inc., Centre Hall, Pennsylvania.

#### **Selected Reports, Publications and Presentations:**

Martin, J. W., J.M. Stiteler, J.E. Davies and R.G. Wiencek. "Archaeological Investigations of the Traylor Family Cemetery, Petersburg, Chesterfield County, Virginia." Report submitted to Appomattox River Water Authority and Virginia Department of Historic Resources, 2003.

Sams, J.I., R.L. Day, J. Stiteler, and M.S. Srinivasan. "Influence of land use and open-water wetlands on water quality in the Lake Wallenpaupack basin, northeastern Pennsylvania." Water Resources Investigation Report 98-4186, U.S. Geological Survey, Lemoyne, Pennsylvania, 1999.

Diamanti, M., J. Stiteler, and J. Pollack. "Archaeological Reconnaissance of Ohio River Islands National Wildlife Refuge in Pennsylvania, West Virginia, and Kentucky and Phase I Archaeological Survey of Manchester Island No. 2, Kentucky." Report submitted to U.S. Fish and Wildlife Service, Hadley, MA, 1998.

Day, R.L., M.A. Calmon, J.M. Stiteler, J.D. Jabro, and R.L. Cunningham. "Water balance and flow patterns in a fragipan using an in-situ soil block." Soil Science 163(7), 517-528, 1998.

"A Geoarchaeological/Paleoenvironmental Investigation of the Aughwick Creek Watershed". Paper presented in conjunction with Dr. Frank Vento and Gary Coppock, M.A., at 2009 PennDOT Byways to the Past Conference, Harrisburg, PA.

"The ABC's of Pedology." Joint paper delivered with Margaret Sams, Skelly and Loy Engineers, to open symposium coordinated by PennDOT District 4, December 2004, Keystone Bldg., Harrisburg, PA.

"The Role of Soil and Landscape Analysis in Archaeology." Paper delivered to annual meeting of West Virginia Association of Professional Soil Scientists, June 2003, Shepherdstown, WV.

"Late Quaternary Surficial Geology of the Delaware River Valley at Trenton." Paper delivered at Archaeological Society of New Jersey Winter Meeting, January 20, 2001, New Jersey State Museum, Trenton, NJ.

"Late Quaternary Surficial Geology of the Delaware River Valley at Trenton, New Jersey." Paper delivered at Society for American Archaeology annual meeting, Philadelphia, PA, April 2000, as part of symposium "Public Archaeology at the Falls of the Delaware: The Lamberton Tunnel", N.J. Rt. 29."

#### **Professional Affiliations:**

Geological Society of America, Archaeological Geology and Quaternary Geology and Geomorphology Divisions  
Society for American Archaeology  
Society for Pennsylvania Archaeology  
American Quaternary Association  
Middle Atlantic Archaeological Conference



**APPENDIX B**

**FIELD FORMS**



# ARCHAEOLOGICAL MONITORING FORM

Date: 12/8/10 Recorders: MA JS

Client: SCCC

Project Name: SCCC Project No.: 1872504

Municipality: Kearny State: NJ

Sample #: 1 Closest Stat #: 20 + 80 <sup>to 20+70</sup> Distance: 0

Approx. Depth: 17-20' Numbers of Machine Buck: 2

Number of Sample Bucks: 30 Full       $\frac{3}{4}$        $\frac{1}{2}$  ☒  $\frac{1}{4}$      

Soil: Texture Sand to loamy Sand Munsell #:       
Some Est. soil

% of gravel less than 21% Size of gravel: sm - med Munsell Color:     

Comments: Clunker + cinder

Artifacts: Type      Quantity      Photo     

Type      Quantity      Photo     

Type      Quantity      Photo     

Type      Quantity      Photo     

Type      Quantity      Photo     

## Samples taken for further analysis:

Type      Description      Quantity      Photo     

Type      Description      Quantity      Photo     

Type      Description      Quantity      Photo     

Type      Description      Quantity      Photo



# ARCHAEOLOGICAL MONITORING FORM

Date: 3/22/11 Recorders: MD JS

Client: SCCC

Project Name: SCCC Project No.: 1872504

Municipality: Kearny State: NJ

Sample #: 2 Closest Stat #: 16+60 to 16+35 Distance: \_\_\_\_\_

Approx. Depth: 16-20' Numbers of Machine Buck: 4

Number of Sample Bucks: 22 Full \_\_\_\_\_  $\frac{3}{4}$  \_\_\_\_\_  $\frac{1}{2}$  X  $\frac{1}{4}$  \_\_\_\_\_

Soil: Texture marsh peat + varved clay  
sandy loamy sand, Est. clays Munsell #: \_\_\_\_\_

% of gravel 20% Size of gravel: sm1-med Munsell Color: \_\_\_\_\_

Comments: Poor quality sample because of mixing  
in truck, high drag point and machining out

Artifacts: Type _____	Quantity _____	Photo _____
Type _____	Quantity _____	Photo _____
Type _____	Quantity _____	Photo _____
Type _____	Quantity _____	Photo _____
Type _____	Quantity _____	Photo _____

## Samples taken for further analysis:

Type _____	Description _____	Quantity _____	Photo _____
Type _____	Description _____	Quantity _____	Photo _____
Type _____	Description _____	Quantity _____	Photo _____
Type _____	Description _____	Quantity _____	Photo _____



# ARCHAEOLOGICAL MONITORING FORM

Date: 3/28/11 Recorders: MA JW

Client: SCCC

Project Name: SCCC Project No.: 1878504

Municipality: Kearny State: NJ

Sample #: 3 Closest Stat #: 11+20 to 11+60 Distance: \_\_\_\_\_

Approx. Depth: 16-21' Numbers of Machine Buck: 2

Number of Sample Bucks: 30 Full \_\_\_\_\_  $\frac{3}{4}$  \_\_\_\_\_  $\frac{1}{2}$  ☒  $\frac{1}{4}$  \_\_\_\_\_

Soil: Texture some marsh mat  
Coarse to fine sands Munsell #: \_\_\_\_\_

% of gravel 0.1% Size of gravel: sm to med Munsell Color: \_\_\_\_\_

Comments: Fine to coarse green + gray sand mixed  
with some pockets of brown. no artifacts but good  
sample

Artifacts: Type _____	Quantity _____	Photo _____
Type _____	Quantity _____	Photo _____
Type _____	Quantity _____	Photo _____
Type _____	Quantity _____	Photo _____
Type _____	Quantity _____	Photo _____

## Samples taken for further analysis:

Type _____	Description _____	Quantity _____	Photo _____
Type _____	Description _____	Quantity _____	Photo _____
Type _____	Description _____	Quantity _____	Photo _____
Type _____	Description _____	Quantity _____	Photo _____



# ARCHAEOLOGICAL MONITORING FORM

Date: Took Sample 3/29/11 Recorders: MA JS

Client: SCCC

Project Name: SCCC Project No.: 1872504

Municipality: Kearny State: NJ

Sample #: 4 Closest Stat #: 6 to 5 to 50 Distance: 10

Approx. Depth: 16 to 21' Numbers of Machine Buck: 1

Number of Sample Bucks: 31 Full       $\frac{3}{4}$        $\frac{1}{2}$  ☒  $\frac{1}{4}$      

Soil: Texture Fine loam to med sandy loam Munsell #:     

% of gravel col 70 Size of gravel: sm to med Munsell Color:     

Comments: Find coal under throughout mostly rounded gravel  
if some angular. Some mica like material.

Artifacts: Type Button Quantity 1 Photo     

Type      Quantity      Photo     

Type      Quantity      Photo     

Type      Quantity      Photo     

Type      Quantity      Photo     

## Samples taken for further analysis:

Type      Description      Quantity      Photo     

Type      Description      Quantity      Photo     

Type      Description      Quantity      Photo     

Type      Description      Quantity      Photo



# ARCHAEOLOGICAL MONITORING FORM

Date: 3/31 Recorders: MT, JS

Client: SCCC

Project Name: SCCC Project No.: 1872504

Municipality: Kearny State: NJ

Sample #: 41 Closest Stat #: 3+00 to 2+00 Distance: 0-10'

Approx. Depth: 18-23' Numbers of Machine Buck: 1

Number of Sample Bucks: 10 Full       $\frac{3}{4}$        $\frac{1}{2}$  (X)  $\frac{1}{4}$      

Soil: Texture loamy med s, loamy f. sand Munsell #: 2.5y 4/2-5/2

% of gravel < 0.1% Size of gravel: f. in Munsell Color:     

Comments: few pc. clinker, 1 pc rd. brick (walnut-size)

Sample from upper part of sand column

Artifacts: Type      Quantity 6 Photo     

Type      Quantity      Photo     

Type      Quantity      Photo     

Type      Quantity      Photo     

Type      Quantity      Photo     

## Samples taken for further analysis:

Type      Description      Quantity      Photo     

Type      Description      Quantity      Photo     

Type      Description      Quantity      Photo     

Type      Description      Quantity      Photo



# ARCHAEOLOGICAL MONITORING FORM

Date: 4/1/11 Recorders: MA JS

Client: SCCC

Project Name: SCCC Project No.: 1872504

Municipality: Kearny State: NJ

Sample #: 5 Closest Stat #: 0+95 to 1+05 Distance: 10'

Approx. Depth: 18'-23' Numbers of Machine Buck: 4

Number of Sample Bucks: 30 Full       $\frac{3}{4}$        $\frac{1}{2}$  ☒  $\frac{1}{4}$      

Soil: Texture Fine to med sand to loamy sand Munsell #: 2.5Y 4/2 - 5/2

% of gravel 20/90 Size of gravel: small to med Munsell Color:     

Comments: Few sub rounded cobbles

1 piece of plastic sample rep quite a bit of column

Artifacts: Type glass Ben Bele Quantity 1 Photo mb

Type      Quantity      Photo     

Type      Quantity      Photo     

Type      Quantity      Photo     

Type      Quantity      Photo     

## Samples taken for further analysis:

Type      Description      Quantity      Photo     

Type      Description      Quantity      Photo     

Type      Description      Quantity      Photo     

Type      Description      Quantity      Photo



# ARCHAEOLOGICAL MONITORING FORM

Date: 4/5/11 Recorders: MA JS

Client: SCCC

Project Name: SCCC Project No.: 1872504

Municipality: Kearny State: NJ

Sample #: 6 Closest Stat #: 65+00 to 64+90 Distance: 10'

Approx. Depth: 16-19' Numbers of Machine Buck: 4

Number of Sample Bucks: 31 Full       $\frac{3}{4}$        $\frac{1}{2}$  ☒  $\frac{1}{4}$      

Soil: Texture Fine to med Sand Munsell #:     

% of gravel 20.1% Size of gravel: sm to med Munsell Color:     

Comments: Very DK sand. (black in sample near 65+00) green to brown other areas

Artifacts: Type Ben Bottle glass, wide Quantity      Photo NO

Type 1 poss. Flake Quantity      Photo     

Type      Quantity      Photo     

Type      Quantity      Photo     

Type      Quantity      Photo     

## Samples taken for further analysis:

Type      Description      Quantity      Photo     

Type      Description      Quantity      Photo     

Type      Description      Quantity      Photo     

Type      Description      Quantity      Photo



# ARCHAEOLOGICAL MONITORING FORM

Date: 4/6/11 Recorders: MA, JS

Client: SCCC

Project Name: SCCC Project No.: 1872504

Municipality: Kearny State: NJ

Sample #: 6i Closest Stat #: 62+50 to 62+40 Distance: Ø

Approx. Depth: 15-18' Numbers of Machine Buck: 1

Number of Sample Bucks: 10 Full      ¾      ½ X ¼     

Soil: Texture S, sm. amt fsl Munsell #: 2.5Y 9/2, 10YR 4/4

% of gravel <0.1% Size of gravel: f-1, few sm. cobbles Munsell Color:     

Comments: less gravel than sample 6; included numerous pieces of granite (lg gravel)

Artifacts: Type few pieces modern bottle glass (brown, clear) Quantity 5-10 Photo no

Type      Quantity      Photo     

Type      Quantity      Photo     

Type      Quantity      Photo     

Type      Quantity      Photo     

## Samples taken for further analysis:

Type Ø Description Ø Quantity Ø Photo     

Type      Description      Quantity      Photo     

Type      Description      Quantity      Photo     

Type      Description      Quantity      Photo



# ARCHAEOLOGICAL MONITORING FORM

Date: 4/12/11 <sup>4/12/11 taken</sup> Recorders: MA JS

Client: SCCC

Project Name: SCCC Project No.: 1872504

Municipality: Kearny State: NJ

Sample #: 7 Closest Stat #: 59+90 to 59+80 Distance: 10'

Approx. Depth: 15-18' Numbers of Machine Buck: 2

Number of Sample Bucks: 30 Full         $\frac{3}{4}$          $\frac{1}{2}$  ☒  $\frac{1}{4}$        

Soil: Texture Fine to coarse Munsell #: 2.5Y 3/2 to 4/2

% of gravel LO. 70 Size of gravel: sm. to med Munsell Color:       

Comments: Few <sup>sm.</sup> rounded cobbles, glass, coal, binder, bricks

Artifacts: Type possible Diabase Flake Quantity 9 Photo       

Type " quartzite flake Quantity 1 Photo       

Type        Quantity        Photo       

Type        Quantity        Photo       

Type        Quantity        Photo       

## Samples taken for further analysis:

Type        Description        Quantity        Photo       

Type        Description        Quantity        Photo       

Type        Description        Quantity        Photo       

Type        Description        Quantity        Photo



# ARCHAEOLOGICAL MONITORING FORM

Date: 4/11/11 Recorders: MA JS

Client: SCCC

Project Name: SCCC Project No.: 1872504

Municipality: Kearny State: NJ

Sample #: 8 Closest Stat #: 55+00 to 55+10 Distance: 10'

Approx. Depth: 15'-18' Numbers of Machine Buck: 2

Number of Sample Bucks: 30 Full       $\frac{3}{4}$        $\frac{1}{2}$  ☒  $\frac{1}{4}$      

Soil: Texture Fine to coarse sand Munsell #: 10YR 4/4 + 2.5Y 3/2

% of gravel < 0.1% Size of gravel: sm. to med. Munsell Color:     

Comments: Glass + brick in approx. 1/2 sample

Artifacts:	Type <u>sm. <sup>Diabase</sup> Bk Flakes poss</u>	Quantity <u>4</u>	Photo <u>    </u>
	Type <u>poss. white quartz</u>	Quantity <u>1</u>	Photo <u>    </u>
	Type <u>poss. exhausted core</u>	Quantity <u>1</u>	Photo <u>    </u>
	Type <u>poss. quartzite stone</u>	Quantity <u>2</u>	Photo <u>    </u>
	Type <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>

## Samples taken for further analysis:

Type <u>    </u>	Description <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Description <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Description <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Description <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>



# ARCHAEOLOGICAL MONITORING FORM

Date: 4/12/11 Recorders: MA JS

Client: SCCC

Project Name: SCCC Project No.: 1822504

Municipality: Kearny State: NJ

Sample #: 8I Closest Stat #: 52+70 to +80 Distance: 10'

Approx. Depth: 15-18' Numbers of Machine Buck: 2

Number of Sample Bucks: 10 Full       $\frac{3}{4}$        $\frac{1}{2}$  ☒  $\frac{1}{4}$      

Soil: Texture Fine to coarse Munsell #: 2.5Y 3/2 to 4/2

% of gravel 40.1% Size of gravel: sm to med. Munsell Color:     

Comments: Glass, clinker, coal, clinder more than in sample #8

Artifacts: Type <u>N/A</u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>

## Samples taken for further analysis:

Type <u>    </u>	Description <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Description <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Description <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Description <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>



# ARCHAEOLOGICAL MONITORING FORM

Date: 4/13/11 Recorders: ML JS

Client: SCCO

Project Name: SCCO Project No.: 1872524

Municipality: Kearney State: NE

Sample #: 9 Closest Stat #: 49190 + 050120 Distance: 10

Approx. Depth: 15-18' Numbers of Machine Buck: 2

Number of Sample Bucks: 30 Full       $\frac{3}{4}$        $\frac{1}{2}$  ☒  $\frac{1}{4}$      

Soil: Texture Fine to coarse Munsell #: 2.5Y 4/1 to 4/2

% of gravel 10.1% Size of gravel: very fine sand to med Munsell Color:     

Comments: Brk glass, clc. glass, Brk, cinder

photos of screens 1, 6, 11, 16, 21 & 26 Kept all gravel 3 bags

Artifacts: Type <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>

## Samples taken for further analysis:

Type <u>    </u>	Description <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Description <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Description <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Description <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>



# ARCHAEOLOGICAL MONITORING FORM

Date: 4/18/11 collected      Recorders: MA BM

Client: SCCC

Project Name: SCCC      Project No.: 1872504

Municipality: Kearny      State: NJ

Sample #: 10      Closest Stat #: 44 + 60 to + 70 Distance: 30'

Approx. Depth: 20-23'      Numbers of Machine Buck: 2

Number of Sample Bucks: 30      Full       $\frac{3}{4}$        $\frac{1}{2}$  ✓  $\frac{1}{4}$      

Soil: Texture Fine to Coarse      Munsell #: ~~10YF~~ - 2.5Y 5/6 ad 2.5Y 4/2 - 5/2

% of gravel < 0.05%      Size of gravel: 1/4 to med      Munsell Color:     

Comments: low gravel content, low content of glass, coal cinder  
of prehistoric      gravel all rd

Artifacts: Type <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>

## Samples taken for further analysis:

Type <u>    </u>	Description <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Description <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Description <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Description <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>



# ARCHAEOLOGICAL MONITORING FORM

Date: 4/19/11 Recorders: MA BM

Client: SCCC

Project Name: SCCC Project No.: 18725011

Municipality: Kearny State: NJ

Sample #: 10 I Closest Stat #: 41 + 70<sup>+90</sup> Distance: 20'

Approx. Depth: 20-23' Numbers of Machine Buck: 2

Number of Sample Bucks: 10 Full       $\frac{3}{4}$        $\frac{1}{2}$  ✓  $\frac{1}{4}$      

Soil: Texture Fine to coarse sand Munsell #: 10YR 4/4 + 7.5Y 3/2 to 4/2

% of gravel < 0.1% Size of gravel: swt to med Munsell Color:     

Comments: Glass (clr, brn, grn), asphalt, coal, brick,  
slag, cln jar

Artifacts:	Type <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
	Type <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
	Type <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
	Type <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
	Type <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>

## Samples taken for further analysis:

Type <u>    </u>	Description <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Description <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Description <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Description <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>



# ARCHAEOLOGICAL MONITORING FORM

Date: 4/21/11 Recorders: MA JS

Client: SCCC

Project Name: SCCC Project No.: 1822504

Municipality: Kearny State: NJ

Sample #: Y1 Closest Stat #: 3940 to 3970 Distance: 20

Approx. Depth: 17-20' Numbers of Machine Buck: 1

Number of Sample Bucks: 30 Full       $\frac{3}{4}$        $\frac{1}{2}$    X    $\frac{1}{4}$      

Soil: Texture loamy VF sand to med sand Munsell #: 2.5Y 4/2

% of gravel CO.1% Size of gravel: very fine to med Munsell Color:     

Comments: glass in over 1/2 of buckets, coal, brick

Artifacts: Type      Quantity      Photo     

Type      Quantity      Photo     

Type      Quantity      Photo     

Type      Quantity      Photo     

Type      Quantity      Photo     

## Samples taken for further analysis:

Type      Description      Quantity      Photo     

Type      Description      Quantity      Photo     

Type      Description      Quantity      Photo     

Type      Description      Quantity      Photo



# ARCHAEOLOGICAL MONITORING FORM

Date: 4/20/11 Recorders: MA, JMS

Client: SCC

Project Name: SCC Project No.: 1872504

Municipality: Kearny State: NJ

Sample #: 11 Closest Stat #: 37+70-37+90 Distance: 20'

Approx. Depth: 18-20' Numbers of Machine Buck: 1

Number of Sample Bucks: 10 Full       $\frac{3}{4}$        $\frac{1}{2}$  X  $\frac{1}{4}$      

Soil: Texture fine to med sand Munsell #: 2.5y 4/2-5/2

% of gravel 40.1% Size of gravel: 1/4" - 1/2", several rd cobbles Munsell Color:     

Comments: high content of coal powder, 7/8 gravel Gravel all rd, few small pc. glass & prehistoric

Artifacts: Type	Quantity	Photo
Type	Quantity	Photo
Type	Quantity	Photo
Type	Quantity	Photo
Type	Quantity	Photo

## Samples taken for further analysis:

Type	Description	Quantity	Photo
Type	Description	Quantity	Photo
Type	Description	Quantity	Photo
Type	Description	Quantity	Photo



# ARCHAEOLOGICAL MONITORING FORM

Date: 4/29/11 Recorders: MA BM

Client: SCCC

Project Name: SCCC Project No.: 1877504

Municipality: Kearny State: NJ

Sample #: 12 Closest Stat #: 35+00 to 34+90 Distance: 10'

Approx. Depth: 18-21' Numbers of Machine Buck: 2

Number of Sample Bucks: 30 Full       $\frac{3}{4}$        $\frac{1}{2}$  ☒  $\frac{1}{4}$      

Soil: Texture Fine to med loamy Sand Munsell #: 2.5Y 4/2 to 5/2

% of gravel <0.5% Size of gravel: sim to med Munsell Color:     

Comments: Increasing amount of Brick, cinder, slag and glass (10 pieces), ceramics

Artifacts: Type possible Flakes Quantity 22 Photo     

Type      Quantity      Photo     

Type      Quantity      Photo     

Type      Quantity      Photo     

Type      Quantity      Photo     

## Samples taken for further analysis:

Type      Description      Quantity      Photo     

Type      Description      Quantity      Photo     

Type      Description      Quantity      Photo     

Type      Description      Quantity      Photo



# ARCHAEOLOGICAL MONITORING FORM

Date: 4/28/11 Recorders: MA BM

Client: SCC

Project Name: SCC Project No.: 1872501

Municipality: Kearny State: NJ

Sample #: 121 Closest Stat #: 32 + 00 <sup>to 31+00</sup> Distance: 10'

Approx. Depth: 18-21' Numbers of Machine Buck: 1

Number of Sample Bucks: 10 Full       $\frac{3}{4}$        $\frac{1}{2}$  ✓  $\frac{1}{4}$      

Soil: Texture Fine sandy loam to med. sand <sup>loamy</sup> Munsell #: 2.5y 6/2 + 7/2 2.5y 4/2

% of gravel < 0.1% Size of gravel: very fine to med Munsell Color:     

Comments: Brick, 3 pieces of glass, coal cinder

Artifacts: Type possible flakes Quantity 8 Photo     

Type      Quantity      Photo     

Type      Quantity      Photo     

Type      Quantity      Photo     

Type      Quantity      Photo     

## Samples taken for further analysis:

Type      Description      Quantity      Photo     

Type      Description      Quantity      Photo     

Type      Description      Quantity      Photo     

Type      Description      Quantity      Photo



# ARCHAEOLOGICAL MONITORING FORM

Date: 4/27/11 Recorders: MA JS

Client: SCCC

Project Name: SCCC Project No.: 1822501

Municipality: Kearny State: NJ

Sample #: 13 Closest Stat #: 30+00 to 39+40 Distance: 10'

Approx. Depth: 18-21' Numbers of Machine Buck: 1

Number of Sample Bucks: 30 Full       $\frac{3}{4}$        $\frac{1}{2}$  ☒  $\frac{1}{4}$      

Soil: Texture Very Fine Sandy loam to loamy med sand Munsell #: 2.5Y 6/2 + 7/2 2.5Y 4/2

% of gravel < 0.5% Size of gravel: very fine to med Munsell Color:     

Comments: Some cinder, brick, total 5 pieces of glass  
mostly diabase flake. 3 poss. stone tools.

Artifacts: Type possible flakes Quantity 35-40 Photo NO

Type      Quantity      Photo     

Type      Quantity      Photo     

Type      Quantity      Photo     

Type      Quantity      Photo     

## Samples taken for further analysis:

Type      Description      Quantity      Photo     

Type      Description      Quantity      Photo     

Type      Description      Quantity      Photo     

Type      Description      Quantity      Photo



# ARCHAEOLOGICAL MONITORING FORM

Date: 4/26/11 Recorders: Bm, JS

Client: SCCC

Project Name: SCCC Project No.: 1872504

Municipality: Kearny, NJ State: NJ

Sample #: 13i Closest Stat #: 27+60 Distance: 20'

Approx. Depth: 18-21' Numbers of Machine Buck: 1

Number of Sample Bucks: 1 Full       $\frac{3}{4}$        $\frac{1}{2}$  X  $\frac{1}{4}$      

Soil: Texture loamy fine sand to med. sand Munsell #: 2.5Y 7/2-6/2 + 2.5Y 4/2

% of gravel 20.5% Size of gravel: of to med Munsell Color:     

Comments: Kept ~ 20 pots. by C. Flakes all do have exc 1 g/l  
all fine to med size no glass

Artifacts: Type <u>possible flakes</u>	Quantity <u>~ 20</u>	Photo <u>no</u>
Type <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>

## Samples taken for further analysis:

Type <u>    </u>	Description <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Description <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Description <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Description <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>



# ARCHAEOLOGICAL MONITORING FORM

Date: 4/26/11 Recorders: JS, BM  
 Client: SCCC  
 Project Name: SCCC Project No.: 1872564  
 Municipality: Kearny State: NJ  
 Sample #: 14 Closest Stat #: 25+00 to 24+90 Distance: ~~10'~~ 6'  
 Approx. Depth: 18-21' Numbers of Machine Buck: 2  
 Number of Sample Bucks: 30 Full       $\frac{3}{4}$        $\frac{1}{2}$  X  $\frac{1}{4}$        
 Soil: Texture V.f. Sandy loam to loamy med sand Munsell #: 2.5Y 7/2 2.5Y 4/2  
 % of gravel < 0.5% Size of gravel: fine to med Munsell Color:       
 Comments: only 3 pc. glass (2 clear ribbed, 1 green bottle)

Artifacts:	Type <u>possible flint</u>	Quantity <u>60-70</u>	Photo <u>no</u>
	Type <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
	Type <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
	Type <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
	Type <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>

## Samples taken for further analysis:

Type <u>    </u>	Description <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Description <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Description <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>
Type <u>    </u>	Description <u>    </u>	Quantity <u>    </u>	Photo <u>    </u>



# ARCHAEOLOGICAL MONITORING FORM

Date: 3/21/11 Recorders: MA/JS

Client: SCCC

Project Name: SCCC Project No.: 1872504

Municipality: Kearny State: NJ

Sample #: 1A Closest Stat #: 18+90-18+00 Distance: 76-200

Approx. Depth: Various depths 12-20' Numbers of Machine Buck: \_\_\_\_\_

Number of Sample Bucks: 10 Full \_\_\_\_\_  $\frac{3}{4}$  \_\_\_\_\_  $\frac{1}{2}$  ☒  $\frac{1}{4}$  \_\_\_\_\_

Soil: Texture Sand, loamy sand Munsell #: \_\_\_\_\_

% of gravel < 1% Size of gravel: fine to med Munsell Color: \_\_\_\_\_

Comments: Samples from several machine buckets, various depths, contains some asphalt, 2 frags white ware

Artifacts: Type _____	Quantity _____	Photo _____
Type _____	Quantity _____	Photo _____
Type _____	Quantity _____	Photo _____
Type _____	Quantity _____	Photo _____
Type _____	Quantity _____	Photo _____

## Samples taken for further analysis:

Type _____	Description _____	Quantity _____	Photo _____
Type _____	Description _____	Quantity _____	Photo _____
Type _____	Description _____	Quantity _____	Photo _____
Type _____	Description _____	Quantity _____	Photo _____



**APPENDIX C**

**RELEVANT COMMUNICATIONS WITH NJDEP**





HPO L 2009 - 198  
Log #10-0206-1 VM

## State of New Jersey

### DEPARTMENT OF ENVIRONMENTAL PROTECTION

NATURAL & HISTORIC RESOURCES, HISTORIC PRESERVATION OFFICE

PO Box 404, Trenton, NJ 08625  
TEL: (609) 984-0176 FAX: (609) 984-0578  
www.state.nj.us/dep/hpo

JON S. CORZINE  
Governor

MARK N. MAURIELLO  
Acting Commissioner

December 29, 2009

Mr. Michael Audin, RPA  
Langan Engineering and Environmental Services Inc.  
River Drive Center 1  
Elmwood Park, NJ 07407

**Re: Hudson County, Kearny Town  
Standard Chlorine Chemical Company Site (SCCC)  
Diamond Site & Koppers Seaboard Site  
Phase IA Cultural Resources Survey**

Dear Mr. Audin:

The comments below are in response to submitted project plans and the following cultural resources report received at the Historic Preservation Office (HPO) on November 5, 2009:

Audin, Michael

August 2009 *Phase IA Cultural Resource Survey for the Standard Chlorine Chemical Company Site, Interim Response Action Work Plan, Town of Kearny, Hudson County, New Jersey.* Prepared by Langan Engineering & Environmental Services, Inc., Elmwood Park, NJ. Prepared for the United States Environmental Protection Agency.

The project's area of potential affects (APE) contains the Edison Battery Plant complex (SHPO opinion of eligibility April 8, 2008). In addition, the APE borders the Pennsylvania Railroad New York to Philadelphia Historic District (SHPO opinion of eligibility March 3, 2003) and the Pennsylvania, New Jersey and New York Railroad Company Portal Bridge (listed on the New Jersey Register of Historic Places on February 22, 1982).

The APE also contains two (2) archaeological resources that may be adversely impacted by the proposed project. A previous study entitled *Jersey City Water Works Historic District* identified portions of the Jersey City Water Works Pipeline (SHPO opinion of eligibility February 20, 2003) that may exist within the western portion of the APE. This report is accessioned in the HPO report collection as MULT HSR 318a. A second recent report entitled *Historic Context Development Hackensack Meadowlands Drainage Systems and Features* identifies potentially significant historic drainage features (ditches, dikes, sluices, and gate



structures) within the APE (See Figure 14 of the above referenced report). This report is accessioned in the HPO report collection as MULT A 240b.

### Archaeology

Proposed project impacts include the construction of shallow ground water conveyance system and a slurry and sheet pile wall around the perimeter of the APE to a depth of 25-feet below grade. The above referenced report recommends the project site holds a low to moderate potential for deeply buried Paleo-Indian through Middle Archaic period Native American archaeological deposits. The report recommends a geomorphological assessment of the completed slurry wall boring logs to reconstruct the paleo-environment and potential for deeply buried Native American archaeological deposits within the APE. In addition, the above referenced report recommends the project site holds a low potential for historic period archaeological resources within the APE. The HPO *disagrees* with this assessment. The APE holds a high potential to contain the archaeological remains of both the Jersey City Water Works Pipeline and historic period drainage features that could be adversely impacted by slurry wall construction.

In consequence, pursuant to 36 CFR § 800.4, a Phase IB archaeological survey, and as necessary Phase II archaeological survey, must be conducted within the area of potential effects (APE) to identify the presence or absence of historic period archaeological properties. Phase IB survey will allow identification of the presence or absence of the Jersey City Waterworks Pipeline and Hackensack Meadowlands Drainage Features and systems within the APE. If identified, Phase II survey will provide for evaluation of the National Register eligibility of the site(s) and assessment of project impacts. Due to the nature of these potentially deeply buried industrial features, backhoe trenching is appropriate to identify the presence of significant industrial resources. In addition to the program of backhoe testing, the HPO concurs a geomorphological assessment of the slurry wall boring logs to assess the potential for deeply buried Native American archaeological deposits is appropriate. For properties listed on or eligible for inclusion in the National Register of Historic Places, recommendations must be provided for avoidance of impacts. If impacts cannot be avoided, analyses must be provided exploring alternatives to minimize and/or mitigate impacts. Means to avoid, minimize and/or mitigate impacts to National Register eligible properties will need to be developed and undertaken prior to project implementation.

All phases of the archaeological survey and reporting will need to be in keeping with the Secretary of the Interior's *Standards and Guidelines for Archeology and Historic Preservation*, and the HPO's *Guidelines for Phase I Archaeological Investigations: Identification of Archaeological Resources and Guidelines for Preparing Cultural Resources Management Archaeological Reports Submitted to the Historic Preservation Office*. These guidelines can be obtained through the HPO's web page (<http://www.nj.gov/dep/hpo/identify/survarkeo.htm>). Reasoning and documentation for areas excluded from testing must be included in the technical report. Evaluations to determine the National Register eligibility of archaeological sites must be in keeping with the National Park Service's 2000 National Register Bulletin, *Guidelines for Evaluating and Registering Archeological Properties*. The individual(s) conducting the work



will need to meet the relevant Department of the Interior's Professional Qualifications Standards for archaeology.

If potential human burials or human skeletal remains are encountered, all ground disturbing activities in the vicinity shall cease immediately and the Historic Preservation Office should be contacted, as well as any appropriate legal officials. The potential burials shall be left in place unless imminently threatened by human or natural displacement.

#### **Historic Architecture**

The project, as proposed, entails the demolition of Buildings No. 16, 19 and 20 of the White Tar Company property (SCCC). Prior consultation between the HPO and the Federal Railroad Administration determined that the White Tar Company is ineligible for listing on the National Register of Historic Places.

The project calls for the demolition of Buildings No. 11 and 12 on the Diamond site. The assessment of eligibility of Buildings No. 11 and 12 on the Diamond site was not conducted by an individual that meets the Secretary of the Interior's Standards for history or architectural history. In consequence, the assessment of the Diamond site needs to be conducted by an individual who meeting the Secretary of the Interior's Standards for history or architectural history. Please resubmit this information so that a determination of effects can be made for the Diamond site demolition.

#### **Additional Comments:**

Thank you again for providing this opportunity for review and comment on the potential for this project to affect historic and archaeological resources. We look forward to receiving the requested surveys discussed above. If you have any questions, please feel free to contact Vincent Maresca of my staff at (609) 633-2395 with questions regarding archaeology or Meghan MacWilliams Baratta (609-292-1253) with questions regarding historic architecture, historic districts, or historic landscapes.

Sincerely,



Katherine J. Marcopul  
Acting Supervising  
Historic Preservation Specialist

c. John Vetter, USEPA



**APPENDIX D**

**ARCHAEOLOGICAL SITE FORM**





NEW JERSEY STATE MUSEUM  
ARCHAEOLOGICAL SITE REGISTRATION PROGRAM  
BUREAU OF ARCHAEOLOGY AND ETHNOLOGY  
P.O. BOX 530, TRENTON, N.J. 08625-0530  
Phone (609) 292-8594; Fax (609) 292-7636

**Site Name:**

**SITE #:** 28- Hd-44 SCCC Site

☐ Check this box if you prefer to have this site information restricted to professional archaeologists, academics and environmental researchers conducting project background research. If so, this form will be considered donated information according to New Jersey State Law.

**NJ State Atlas Coordinates:**

**USGS 7.5 Minute Series Quad.:** Jersey City and Weehawken Quads

**State Plane Coordinates (required):** 699001 ft N 2157741 ft E

**UTM Coordinates (required):** 18 0576 202E 4511286N

**County:** Hudson

**Township:** Kearny

**Location (descriptive):**

The site is a former industrial site on the western side of the Hackensack River, across from Secaucus Junction and south of the railroad. The site is bordered by the Hackensack River to the east, the Amtrak Railroad line to the north, Bellville turnpike to the west and the Seaboard site to the south. Site was found during slurry wall construction, a 3-foot wide 7,000 foot long trench excavation, and flakes and debitage were found in several locations along the excavation corridor.

**Period of Site:**

Prehistoric

**Cultural Affiliation(s) (if known):**

Unknown

**Owner's (Tenant's) Name:** Peninsula Restoration Group (Beazer East, Inc., Standard Chlorine Chemical Co., Inc. and Tierra Solutions, Inc.)

**Address**

**Phone:**

**Attitude Toward Preservation:**

Unknown

**Surface Features:**

Some buildings on site with level paved and gravel covered areas.

**Prominent Landmarks:**

Portal Bridge and former Pennsylvania Railroad corridor

**Vegetation Cover:**

Mostly pavement and gravel with some grasses and wetland plants

**Nearest Water Source:** Hackensack River

**Distance:** Adjacent to the property.

**Soil Type:**

**Erosion:** Minimal

**Stratified (if known):**

Most likely below marsh mat

**Threat of Destruction (if known):**

None, currently a Superfund site that is being capped.

**Previous Work and References (list below):**

	Name	Date	Reference (n/a if unpublished)
1.	Audin, Michael	7/10	Summary Phase IB Cultural Resource Report for the Standard Chlorine Chemical Company Site, Interim Response Action Workplan, Kearny, Hudson County, NJ
2.	Audin, Michael	8/09	Phase IA Cultural Resource Survey for the Standard Chlorine Chemical Company Site, Interim Response Action Workplan, Town of Kearny, Hudson County, NJ
3.	AKRF	2008	Portal Bridge Capacity Enhancement Project: Final Environmental Impact Statement, Hudson County, New Jersey. For: Amtrak and NJ Transit.
4.	AD Marble	2008	Access to the Region's Core: Final Environmental Impact Statement; Phase 1A Archaeological Survey Report. Version 3.0. For: New Jersey Transit.

**Collections:**

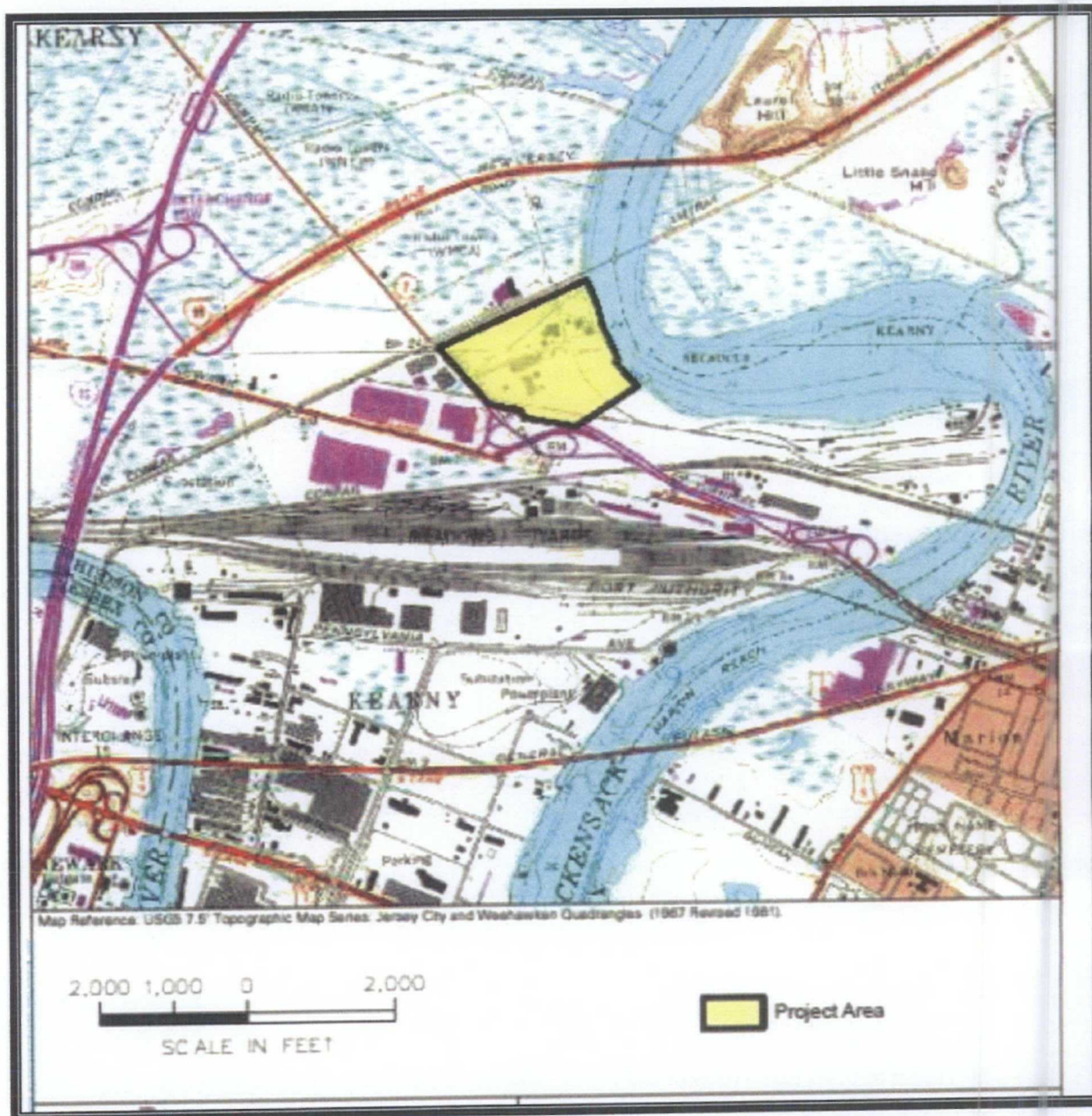


	Name	Date	Collection Stored	Previous Designation
1.				

### Sketch Map of the Site:

Indicate the chief topological features, such as streams, swamps, shorelines, and elevations (approximate). Also show buildings and roads. Indicate the site location by enclosing the site area with a dotted line. Use a scale (approximate) to indicate distance and dimensions.

↑  
North



Observations, Remarks, or Recommendations:



Archaeological monitoring was conducted during the excavation and construction of a slurry wall around the perimeter of the former White Tar company property and the former Edison Battery Plant property (collectively, the SCCC site), the Diamond site and a portion of the (Koppers) Seaboard Site, located on the Kearny Peninsula in the Town of Kearny, New Jersey. The monitoring was conducted to determine if prehistoric materials or features were present in deep alluvial soils of approximately 9 to 17 feet below surface at the site. A previous study of the geomorphology of the site (Stiteler 2010), conducted through interpretation of geotechnical boring logs, identified a stratum of sandy alluvium 3 to 8 feet thick beneath fill and thick marsh mat. The presence of the broad area of sandy sediment, which appears to be somewhat anomalous in the Meadowlands setting, suggests that as this part of the Hackensack River valley was affected by Late Holocene sea level rise and marsh formation, the area between the Passaic and Hackensack River channels formed a local topographic high where inundation would have been delayed. If this is the case, this area of sandy, well-drained soils near the confluence of two major local drainages and providing access to estuarine resources would have been an attractive habitation setting.

A total of 14 samples and 7 interim samples were taken along the alignment of the proposed slurry wall. Evidence of possible prehistoric use of the area was recovered in eight of the samples – a total of 146 possible pieces of lithic debitage and a possible depleted core were recovered during the sampling. The majority of the flakes recovered were found along the eastern alignment of the slurry wall across the Hackensack River from Snake Hill, a diabase intrusion which is the likely source of much of the lithic material. Artifacts were also recovered along the western alignment of the slurry wall. Samples from the northern and southern portions of the slurry wall did not produce any prehistoric artifacts. An archaeological site form will be filed with the New Jersey State Museum (Appendix D).

Since no additional excavation is currently scheduled for the site only general recommendations can be made from the archaeological monitoring. First, we would recommend conducting archaeological monitoring on any proposed slurry wall site, where a medium to high potential for archaeological materials exists. Second, for the current project site, we would recommend additional archaeological monitoring for any future deep excavation (roughly 15 feet or more below surface), below the marsh mat, within the Diamond Shamrock or Standard Chlorine sites, especially if it is along the Hackensack River.

**Recorder's Name (Company):** Michael Audin and John Stiteler  
for Langan Engineering and Environmental Services.  
**Address:** River Drive Center 1, Elmwood Park, NJ  
**Phone:** 973-919-1965  
**Date Recorder at Site:** 6/29/2011

*Revised 2007*



**APPENDIX E**

**RADIOCARBON DATING REPORT**





*Consistent Accuracy . . .  
... Delivered On-time*

Beta Analytic Inc.  
4985 SW 74 Court  
Miami, Florida 33155 USA  
Tel: 305 667 5167  
Fax: 305 663 0964  
Beta@radiocarbon.com  
www.radiocarbon.com

Darden Hood  
President  
  
Ronald Hatfield  
Christopher Patrick  
Deputy Directors

September 26, 2011

Mr. Michael Audin  
619 River Drive Center 1  
Elmwood Park, NJ 07407  
USA

RE: Radiocarbon Dating Result For Sample 187250480511

Dear Mr. Audin:

Enclosed is the radiocarbon dating result for one sample recently sent to us. It provided plenty of carbon for an accurate measurement and the analysis proceeded normally. The report sheet contains the method used, material type, and applied pretreatments and, where applicable, the two-sigma calendar calibration range.

This report has been both mailed and sent electronically. All results (excluding some inappropriate material types) which are less than about 20,000 years BP and more than about ~250 BP include a calendar calibration page (also digitally available in Windows metafile (.wmf) format upon request). Calibration is calculated using the newest (2004) calibration database with references quoted on the bottom of the page. Multiple probability ranges may appear in some cases, due to short-term variations in the atmospheric  $^{14}\text{C}$  contents at certain time periods. Examining the calibration graph will help you understand this phenomenon. Don't hesitate to contact us if you have questions about calibration.

We analyzed this sample on a sole priority basis. No students or intern researchers who would necessarily be distracted with other obligations and priorities were used in the analysis. We analyzed it with the combined attention of our entire professional staff.

Information pages are also enclosed with the mailed copy of this report. If you have any specific questions about the analysis, please do not hesitate to contact us. Someone is always available to answer your questions.

Thank you for prepaying the analyses. As always, if you have any questions or would like to discuss the results, don't hesitate to contact me.

Sincerely,

  
Digital signature on file



**BETA ANALYTIC INC.**

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## REPORT OF RADIOCARBON DATING ANALYSES

Mr. Michael Audin

Report Date: 9/26/2011

Material Received: 8/8/2011

Sample Data	Measured Radiocarbon Age	$^{13}\text{C}/^{12}\text{C}$ Ratio	Conventional Radiocarbon Age(*)
Beta - 303721 SAMPLE : 187250480511 ANALYSIS : AMS-ADVANCE delivery MATERIAL/PRETREATMENT : (peat): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1160 to 1260 (Cal BP 790 to 690)	840 +/- 30 BP	-25.0 o/oo	840 +/- 30 BP

Dates are reported as RCYBP (radiocarbon years before present, "present" = AD 1950). By international convention, the modern reference standard was 95% the  $^{14}\text{C}$  activity of the National Institute of Standards and Technology (NIST) Oxalic Acid (SRM 4990C) and calculated using the Libby  $^{14}\text{C}$  half-life (5568 years). Quoted errors represent 1 relative standard deviation statistics (68% probability) counting errors based on the combined measurements of the sample, background, and modern reference standards. Measured  $^{13}\text{C}/^{12}\text{C}$  ratios (delta  $^{13}\text{C}$ ) were calculated relative to the PDB-1 standard.

The Conventional Radiocarbon Age represents the Measured Radiocarbon Age corrected for isotopic fractionation, calculated using the delta  $^{13}\text{C}$ . On rare occasion where the Conventional Radiocarbon Age was calculated using an assumed delta  $^{13}\text{C}$ , the ratio and the Conventional Radiocarbon Age will be followed by "m". The Conventional Radiocarbon Age is not calendar calibrated. When available, the Calendar Calibrated result is calculated from the Conventional Radiocarbon Age and is listed as the "Two Sigma Calibrated Result" for each sample.



# CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-25:lab. mult=1)

Laboratory number: **Beta-303721**

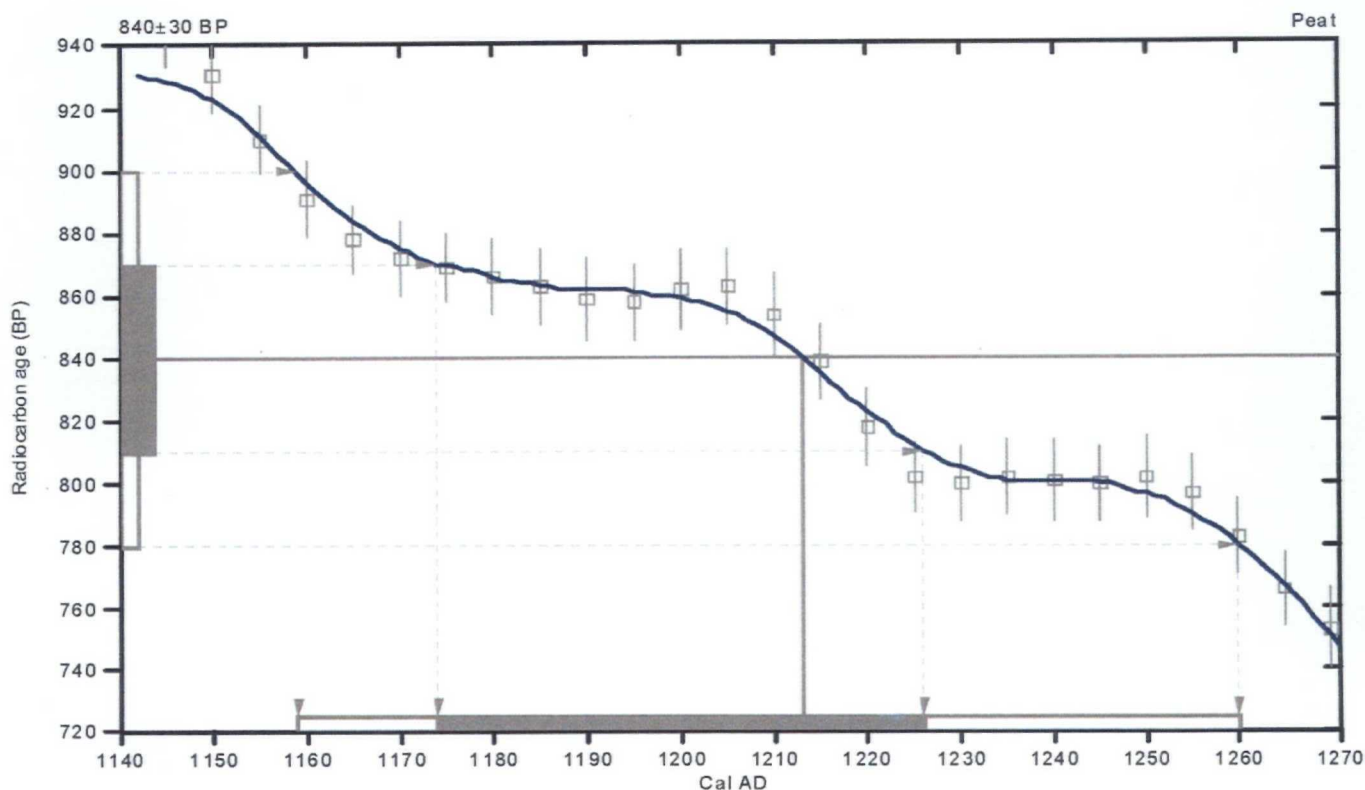
Conventional radiocarbon age: **840±30 BP**

**2 Sigma calibrated result: Cal AD 1160 to 1260 (Cal BP 790 to 690)**  
(95% probability)

Intercept data

Intercept of radiocarbon age  
with calibration curve: Cal AD 1210 (Cal BP 740)

**1 Sigma calibrated result: Cal AD 1170 to 1230 (Cal BP 780 to 720)**  
(68% probability)



## References:

*Database used*

*INTCAL04*

*Calibration Database*

*INTCAL04 Radiocarbon Age Calibration*

*IntCal04: Calibration Issue of Radiocarbon (Volume 46, nr 3, 2004).*

*Mathematics*

*A Simplified Approach to Calibrating C14 Dates*

*Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2), p317-322*

## Beta Analytic Radiocarbon Dating Laboratory

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**APPENDIX F**

**ANNOTATED BIBLIOGRAPHY**



Author: Michael Audin, RPA and John Stitler  
Title: Archaeological Monitoring Report during the construction of the  
Slurry Wall for the Standard Chlorine Chemical Company Site,  
Interim Response Action Workplan  
Town of Kearny, Hudson County, New Jersey  
Location: Town of Kearny  
Drainage Basin: Hackensack River, Hudson River, Atlantic Ocean  
U.S.G.S. Quad: Jersey City and Weehawken, NJ  
Project: Environmental Interim Remedial Action  
Level of Survey: Identification-Level Archaeological Survey  
Cultural Resources: Former Edison Battery Plant Property, Late Woodland Period  
Lithic Debitage and Microcore.